THE

AMERICAN GAS-LIGHT JOURNAL.

THE OFFICIAL GAZETTE OF

LIGHT, HEAT, WATER-SUPPLY, AND SEWERAGE.

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COAL PRODUCT OF FRANCE.

The formation has been nearly matured in France of an extensive credit establishment to be specially devoted to industrial operations, and to be styled the General Society of Commerce and Industry. The capital of the new company has been fixed at £4,800,000, which is expected to prove an ample amount for the prosecution of the proposed operations. An extension of French mining and metallurgical industry forms a decided element in the programme of the company, which counts among its promoters M. Schneider, M. Talabot, and M. Bartholony. The constitution of this highly important enterprise has attracted the attention of the *Credit Mobilier*, which, not wishing to be left in the rear in the matter of capital, has solicited authority for an increase of its share resources from £2,400,000 to £4,800,000. It is understood that the *Credit Mobilier* is also disposed to communicate an impulse to the working of coal mines in France, two or three important projects in this direction having been seriously examined of late by the Council of Administration. The *Credit Mobilier* has undoubtedly been a means of opening up valuable sources of additional wealth to France, while it has taken precious good care of its own interests, and has paid during the last year or two very *gros* dividends. As regards the extraction of additional coal in France, it seems practicable, if only additional labor and capital were brought to bear. The indigenous production this year is expected to amount to 11,000,000 tons in round figures, and it will be seen that since the close of the great European struggle which resulted in the fall of Napoleon I., France has been making a constant progress in the matter of coal mining:

Year.	Coal ext'ed in France.
1814	788,000
1824	1,325,000
1834	2,489,000
1844	3,782,000
1854	6,827,000
1864 (estimated)	11,000,000

—*U. S. Railroad and Mining Register.*

NEW PETROLEUM REGION.

We clip from the Wheeling *Intelligencer*, of the 7th inst., the following:

"A friend, who visited, last week, the Horse Neck oil region, commonly known by the name of Bull Creek oil region, and situated in Pleasants county, Western Virginia, twenty miles northeast from Parkersburg, and five miles from the Ohio river, on a branch of Bull creek, informs us that the excitement about the great Gilfillen flowing well increases daily, and hundreds of persons are visiting it. The company owning the well are erecting three large wooden cisterns capable of holding twelve hundred barrels each. The pipe conducting the oil from the well is so plugged as to leave an orifice of half an inch for the oil to flow out. On Wednesday morning last this half-inch stream was turned into cistern number one, and in three days and nights it was filled brimming full. Surrounding the well are a number of pits with an aggregate area of an acre now filled with oil to the depth of five feet. A quantity of oil, upon tapping the oil stratum, flowed off into Horse Neck Run and was lost, and these pits were then dug for saving a portion of the flowing flood of oil, which could not by any means be entirely restrained. Experienced oil men assert that if the well was permitted to flow to its full capacity, its yield would be from twelve to fifteen hundred barrels a day. We have also learned from an interested party that one-half of the Gilfillen flowing well has been sold to a company of eastern capitalists for ninety thousand dollars."

We have also been informed by a gentleman who has recently visited the Horse Neck region, that the flow of oil was stopped for two days by an impediment in the pipe through which the oil flows, at a depth of 250 feet from the earth's surface. This being removed the flow of oil recommenced with its usual force and volume.

We also learn that two of our citizens are interested in valuable property in the Horse Neck region, and are now engaged in boring several wells.—*Cumbland (Md.), Union.*

GAS EXPLOSION AT UTRECHT.

The following letter respecting a recent explosion at Utrecht, is published in the London *Chemical News*:

Sir,—I observe in your very valuable periodical that a singular dispute is carried on between Professor Mulder, of Utrecht University, and several other chemists, as to the danger of using, in the manufacture of gas, coals damaged by sea water. Soon after the accident alluded to, I minutely examined the works, and, as a matter of course, my conversation with the manager turned to the cause of the explosion. Without desiring to speak in the least in a disparaging manner about Professor Mulder, I think the cause of the explosion can be accounted for in a far more simple and plausible manner than by coming to a rather so-far sought cause as Mulder does. I will first detail the particulars which I learned while at Utrecht, and then discuss in how far Mulder's theory can be of any avail in this instance. The gas-works were started in September, 1862, but there was a defect in the tanks of the gas-holders, which prevented the latter being employed to their full capacity. In consequence thereof the manager experienced, during the long winter nights, considerable difficulty in keeping up the supply of gas; and this diffienlty was overcome by increasing, during the first hours of the evening, the number of working retorts. At the latter end of December, 1862, it appears the manager was absent from the works for a couple of days, and, as far as I understand, he was absent on the night when the explosion took place. The explosion was not exactly in or about the purifiers (dry lime), but proceeded from the purifier house, and the manner in which gas escaped is simply enough accounted for. It is in the first place more than probable that the workmen had packed the lime in too moist a state* on the perforated frames or grates of the purifiers, and had not also, as it would appear, taken sufficient care that the water in the brim of the purifiers was sufficiently filled to prevent an escape of gas after the lowering of the purifier cover. But moreover, it appears that more gas was passed or forced through the purifiers than they were intended to carry in a given time; hence, over-pressure and the gas not being able to make its way through the lime, blew off what water yet remained between the purifier cover and the external and internal brim of the former, and found its way in the house where there was no sufficient ventilation, and unfortunately not far distant a gas flame unprotected by wire gauze, and thus the explosion—the gas being, of course, mixed with air—took place, seriously injuring the building, and, if I recollect aright, also damaging one of the purifier covers. The cause of the escape of gas is by no means a complicated cause at all, as Mulder would make it, and it is very questionable whether the reason assigned by him is at all likely to cause the result he would make us believe it has had. Granting for the moment that hydrochloric acid† is evolved along with gas, if coals injured by sea-water are used in the manufacture, then it must not be lost sight of that, first, ammonia is also a product of the distillation of coal; and, second, that the gas, previous to entering the purifiers at the Utrecht gas-works passes through a system of pipes for condensing tar, then enters a washing vessel, and next a scrubber filled with coke, and where the gas is made to meet with a stream of cold water which falls upon the coke, the gas entering from the bottom and proceeding towards the top of the scrubber. Only after this the gas enters the purifiers, and considering the solubility of hydrochloric acid in water—the presence of ammonia and other volatile alkaline products of the distillation of the coal, it is not only very unlikely, but almost impossible, that any hydrochloric acid should have been left to enter the purifiers; and even if there were some, it cannot but be a minute trace, and that while being absorbed by the lime in the purifiers will not possibly be able to form chloride of calcium to such an extent as to choke the pipes leading to and from the purifiers. I am, &c., DR. A. ADRIANI.

* The lime used in the so-called dry lime purifiers is slaked lime moistened with a sufficient quantity of water to be perceptibly humid, but still able to be passed through a not too small meshed riddle. The chemical action which commences after the gas passes through, causes the lime to swell and to harden considerably; so that if care is not taken to place the lime lightly on the grates, it may happen that either the passage of the gas through the lime is stopped altogether, or, at least, rendered very difficult, thereby increasing the pressure, which it is just intended to avoid by the use of dry lime purifiers.

† When a quantity of salt is thrown in a blazing coal fire, or on the burning coals of a steam-boiler furnace, the smoke accompanying the combustion under ordinary circumstances is quelled, but hydrochloric acid escapes from the chimney. I do not see how in gas retorts chlorine could be evolved unless in combination with hydrogen.

THE SHEFFIELD DISASTER.

The Sheffield, England, Water Company, have issued the following circular to their shareholders, relating to the terrible calamity which recently occurred:

WATER COMPANY'S OFFICES,
Sheffield, March 21, 1864.

To the shareholders in the company of the proprietors of the Sheffield Water-works: The directors of your company deplore that, after the company has existed for thirty-four years without having suffered from any serious disaster, they have to address you on so great a calamity as that of the 11th inst. It is hardly necessary to say that the principal subject of regret to your directors is, that the accident should have caused so much loss of life and so much human suffering. They regret, also, that a great destruction of property has been caused, and that the prospects of the company are at present materially affected. They have to inform you, that since the first confusion created by the accident has subsided, their best endeavors have been directed to ascertain the extent and particulars of the damages sustained; and they are also endeavoring to procure the best possible legal advice upon the question of the liability of the company, and as to the proper and most practical mode of dealing with the affairs of the company, under the circumstances in which they are now placed. The directors, in case they should find such a step desirable, will take an opportunity of calling the shareholders together, before the ensuing general meeting. At present, however, there are no circumstances known to the directors, which have not necessarily publicly transpired. I have the honor to remain, your obedient servant, W. SMITH, Chairman.

GAS-LIGHT COMPANIES IN THE UNITED STATES.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY & CO., No. 11 BROAD STREET, NEW YORK, SHARE BROKERS.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1857	ADRIAN	Mich.	50,000	50	—	May & November.	4,000	3 50	....	....	
1856	AKRON	O.	20 000	33⅓	—	Do.	3,500	3 00	....	....	
1845	ALBANY	N. Y.	25 . 0	20	4	January & July.	65,000	3 00	120	....	None in market.
1858	ALBION	N. Y.	30,000	100	—	Do.	3,000	3 80	....	....	
1851	ALEXANDRIA	Va.	106,530	—	—	City Works.	9,000	3 50	....	....	
1852	ALLEGHANY	Pa.	200,000	25	4	May & November.	25,000	3 00	....	....	
1858	ALLENTOWN	Pa.	60,000	100	3½	Do.	5,000	3 50	....	....	
1857	ALTON	Ill.	75,000	—	—	Private Works.	4,000	3 50	....	....	
1859	ALTOONA	Pa.	40,000	20	4	January & July.	5,000	3 00	....	....	
1859	AMESBURY AND SALISBURY	Mass.	30,000	25	—	Do.	7,000	4 00	....	....	
1858	ANNAPOLIS	Md.	100,000	25	—	Do.	4,000	4 00	....	....	
1858	ANN ARBOR	Mich.	23,000	50	5	March & September.	5,500	4 00	....	....	
1858	ASTORIA	N. Y.	20,000	50	—	Do.	6,000	4 00	....	....	
1855	ATLANTA	Ga.	50,000	25	5	January & July.	12,000	5 00	....	....	
1857	ATTLEBORO'	Mass.	6,000	50	3	Do.	2,000	6 00	....	....	
1850	AUBURN	N. Y.	80,000	50	5	Do	10,000	7 00	....	....	
1851	AUGUSTA	Ga.	80,000	25	8	Do.	9,000	6 00	....	....	
1853	AUGUSTA AND HALLOWELL	Me.	84,700	50	5	Do.	10,000	4 00	....	....	
1860	AURORA	Ind.	10,000	—	—	Private Works.	3 500	3 50	....	....	Formerly used Sanders' Water-Gas. Recently altered to Coal Gas-Works.
1817	BALTIMORE	Md.	550,000	100	5	June & December.	150,000	2 50	150	....	None for sale.
1852	BANGOR	Me.	120,000	100	2½	January & July.	12,000	3 00	100	....	
1855	BATAVIA	N. Y.	32,000	20	4	Do.	2,500	4 00	100	100	Stock firm. Good works and well managed.
1853	BATH	Me.	65,000	100	3	April & October.	10,000	3 75	...	...	
1859	BATH	N. Y.	15,000	50	—	May & November.	3,000	7 00	....	....	
1861	BATTLE CREEK	Mich.	15,000	—	—	January & July.			....	....	
1858	BELFAST	Me.	14,000	100	—	Do.	7,000	7 00	....	....	
1856	BELLEFONT	Pa.	20,000	25	2	Do.	3,500	4 00	....	....	
	BELOIT	Wis.	30,000	—	—	Do.	4,000	4 00	....	....	
1854	BETHLEHEM	Pa.	50,000	50	4	June & December.	2,000	3 20	...	....	
1859	BEVERLY	Mass.	40,000	100	—	January & July.	4,000	4 00	....	....	
1853	BINGHAMPTON	N. Y.	50,000	50	3½	Do.	10 000	4 00	....	....	
1859	BIRMINGHAM	Pa.	40,000	50	—	Do.	4,000	4 00	....	....	
1855	BLOOMINGTON	Ill.	40,000	50	—	Do.	6.000	4 00	....	....	
1858	BORDENTOWN	N. J.	50,000	25	3	June & December.	4,000	3 80	....	....	
1822	BOSTON	Mass.	1,000,000	500	5	Do.	180,000	2 50	....	....	
1859	BRATTLEBORO'	Vt.	21 000	—	—	Do.	3,000	4 00	....	....	
1851	BRIDGEPORT	Ct.	90,000	25	4	January & July.	10,000	4 00	90	....	Passed last dividend.
1857	BRIDGETON	N. J.	50,000	20	—	Do.	5,000	4 00	....	....	
1856	BRISTOL	Pa.	30,000	25	3	February & August.	3,000	4 00	....	....	
1855	BRISTOL	R. I.	35,000	50	2	January & July.	6,000	4 00	....	....	
1859	BROCKPORT	N. Y.	25,000	100	3	Do.	1,500	4 00	....	....	
1853	BROOKLINE	Mass.	77,000	100	4	February & August.	8,500	3 50	....	....	
1825	BROOKLYN	N. Y.	2,000,000	25	5	January & July.	75,000	2 50	170	160	
	BROWNSVILLE	Pa.				Do.			....	....	
1848	BUFFALO	N. Y.	600,000	50	5	Do.	70,000	2 90	140	125	
1852	BURLINGTON	N. J.	100 000	25	3½	Do.	5,000	4 00	105	....	
1853	BURLINGTON	Vt.	75,000	25	2½	Do.	10,000	4 50	....	....	
1859	BURLINGTON	Iowa.	65,000	50	—	Do.	8,000	4 00	....	....	
1861	CALAIS	Me.	90,000	100	—	Do.	10,000	3 50	....	....	
1852	CAMBRIDGE	Mass.	300,000	100	5	February & August.	20.000	3 50	100	97½	
1852	CAMDEN	N. J.	300,000	100	3	April & October.	15,000	3 85	105	100	
1853	CANANDAIGUA	N. Y.	50,000	50	—	January & July.	3,000	4 00	90	80	
1856	CANTON	O.	19,0 0	50	6	March & September.	6,000	3 00	....	....	
1853	CAPE ISLAND	N. J.	80,000	100	—	October.	10,000	6 00	....	...	Watering place.—These Works only run in summer.
1860	CARBONDALE	Pa.	16,000	25	—	March & September.	5,000	4 00	....	....	
1855	CARLISLE	Pa.	30,000	25	—	January & July.	4,000	4 00	...	...	
1856	CATASAUQUA	Pa.	15,000	25	5	May & November.	2,000	4 00	....	....	
1858	CATSKILL	N. Y.		—	—	Private Works.	3.000	3 00	....	....	Owned by G. T. Sutton.
1857	CHAMBERSBURG	Pa.	30,000	25	—	January & July.	3,000	4 00	....	....	
1846	CHARLESTON	S. C.	723,800	25	4	Do.	50,000	4 00	....	....	
1851	CHARLESTOWN	Mass.	200,000	50	4	Do.	30,000	3 00	....	....	
1858	CHARLOTTE	N. C.	14.000	50	10	March & September.	3,500	6 00	....	....	
1859	CHARLOTTEVILLE	Vt.	15,000	25	—	Do.	4,000	4 50	....	...	
1851	CHELSEA	Mass.	100 000	100	3½	January & July.	8,000	3 50	....	....	
1856	CHESTER	Pa.	35,000	25	3	April & October.	4,000	4 00	....	....	
1849	CHICAGO	Ill.	1,500,000	25	5	January & July.	100,000	2 50	150	140	Very scarce. Stock wanted.
1857	CHICOPEE	Mass.	50,000	20	—	Do.		4 00	....	....	
1851	CHILLICOTHE	O.	40,000	25	4	Do.	12,000	3 50	....	....	
1841	CINCINNATI	O.	1,600,000	100	5	Do.	225,000	2 50	....	....	
1859	CITIZENS', BROOKLYN	N. Y.	1,000,000	20	—	Do.	135,000	3 00	128	125	
1860	CITIZENS', READING	Mass.	90,000	100	—				....	....	
	CLARKESVILLE	Tenn.	100,000	50	—	Do.	5,000	4 00	....	....	
1860	CLAREMONT	N. H.	20 000	100	—	March & September.	3,000	4 00	....	....	
1846	CLEVELAND	O.	200,000	10	5	January & July.	20,000	3 00	....	....	
1858	CLINTON	Mass.	30,000	500	5	Do.	3,000	4 00	....	....	
1859	CLYDE	N. Y.	10,000	50	4	Do.	2,500	4 00	...	....	
1854	COHOES	N. Y.	50,000	20	3½	April & October.	5,000	3 60	....	....	
1860	COLD SPRING	N. Y.	30,000	50	—	Do.	3,500	4 00	95	....	Formerly Rosin-Gas, but now Coal. A well managed company. Stock firmly held.
1860	COLD WATER	Mich.	25,000	50	5	January & July.	4,000	4 00	....	....	
1852	COLUMBIA	Pa.	37,500	25	—	Do.	4,000	3 50	....	....	
1852	COLUMBIA	S. C.	44,000	25	4	Do.	6,000	6 00	...	....	
1857	COLUMBIA	Cal.	50,000	25	—	Do.	4,500	10 00	....	....	
1853	COLUMBUS	Ga.	54,000	25	5	Do.	5,000	7 00	....	....	
1850	COLUMBUS	O.	100,000	10	6	Do.	30.000	3 00	....	....	
1853	CONCORD	N. H.	50 000	50	5	Do.	8,000	3 50	....	....	
1853	COVINGTON AND NEWPORT	Ky.	100,000	50	3½	Do.	28.000	4 00	...	....	
1854	CUMBERLAND	Md.	60,000	50	3	Do.	6,000	4 00	....	....	
1857	DANBURY	Ct.	50,000	25	4	Do.	2,000	3 75	....	...	
1856	DANVILLE	Pa.	30,000	25	—	June & December.	3 000	4 00	....	....	
1855	DAVENPORT	Iowa.	56,000	100	—	Do.	6,000	5 00	....	....	
1848	DAYTON	O.	50,000	25	5	February & August.	8,000	3 50	....	....	
1853	DEDHAM	Mass.	40 000	50	—	January & July.	3,000	4 00	....	....	
1860	DELAWARE	O.	30,000	25	—	Do.	2,500	3 00	....	....	
1849	DETROIT	Mich.	500,000	50	5	Do.	30,000	3 50	160	150	Excellen tock. No sales.
1860	DOBBS' FERRY	N. Y.	25,000	—	—	Do.	3,000	4 00	....	....	
1854	DORCHESTER	Mass.	150,000	100	—	Do.	14,000	4 00	....	....	
1859	DOVER	Del.	12,000	—	—	Private Works.	2,000	4 00	....	....	
	DOVER	N. H.				January & July.			....	....	
1857	DOYLESTOWN	Pa.	50,000	—	—	Do.	3.000	4 00	....	....	
1854	DUBUQUE	Iowa.	50,000	115	3½	Do.	17,000	4 50	....	115	This stock is wanted at par.
1858	EAST BOSTON	Mass.	133,000	25	4	Do.	20,000	3 50	....	145	
1858	EAST GREENWICH	R. I.	11,200	100	15	Do.	3,000	7 00	....	...	No transactions.
1861	EAST HAMPTON	Mass.	10,000	25	—	Do.	5,000	9 00	....	....	
1861	EAST NEW YORK	N. Y.	50,000	50	—	Do.	12,000	3 50	....	....	
1857	EASTON	Md.	9,000	10	—	Do.	1,500	7 00	....	....	
1850	EASTON	Pa.	125,000	50	4	June & December.	6,000	3 60	....	....	
1856	EASTPORT	Me.	50,000	55	—	Do.	3,000	4 00	....	....	
1855	ELIZABETH	N. J.	100,000	20	4	January & July.	14,000	3 50	....	....	
	ELLICOTT'S MILLS	Md.	10,000	—	—	Do.	4,000	4 00	....	....	
1852	ELMIRA	N. Y.	50,000	25	3½	Do.	5,000	4 00	....	...	
1852	ERIE	Pa.	68,000	50	3½	June & December.	10.000	3 00	....	....	
1853	EVANSVILLE	Ind.	60,000	50	4	January & July.	12,000	4 00	110	....	
	EXETER	N. H.	60,000	—	—	Do.	12,000		....	...	A very good Company.
	FAIR HAVEN	Ct.	20,000	25		Do.	8,000	4 00	....	....	
1847	FALL RIVER	Mass.	26,000	—	—	Private Works.	12,000	3 50	....	....	
1859	FAYETTEVILLE	N. C.	25,000	100	6	January & July.	7.000	6 00	....	....	
	FIFTH WARD (Milwaukee)	Wis.	50,000	25	—	Do.	10,000	4 00	....	....	
1857	FISHKILL	N. Y.	10,000	20	—	April & October.	1,500	9 00	....	....	
1853	FITCHBURG	Mass.	100,000	50	3	January & July.	5,000	4 00	....	....	Make Petroleum-Gas.
1859	FLEMINGTON	N. J.	20,000	—	—	Do.	3,000	4 00	....	....	
1855	FLUSHING	N. Y.	20,000	50	1½	March & September.	6,500	4 00	...	....	
1858	FOLSOM	Cal.								....	
	FORT WAYNE	Ind.	40,000	25	—	Do.	6.000	4 00	...	...	
1851	FRANKFORT	Ky.	50,000	—	—	City Works.	5.500	4 50	...	....	
1851	FREDERICK CITY	Md.	36,000	100	—	January & July.	5,000	6 70	....	....	
1854	FREDERICKSBURG	Va.	72,500	50	5	Do.	4,500	4 00	....	....	
1858	FREDONIA (Natural Gas)	N. Y.	10,000	100	—	Do.	2.000	4 00	....	....	Unlimited supply of Natural Gas.
1854	FREEPORT	Ill.	20,000	100	—	May & November.	10,000	4 00	....	....	

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When Chartered.	Town.	State.	Chartered Capital.	Par Val. Per Sh. $	Semi-Ann'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1859	Fremont	O.	25,000	25	—	May & November.	2,000	4 50	....	....	
1858	Fulton	N. Y.	12,000	100	—	Do.	4,000	7 00	....	....	
1855	Galena	Ill.	70,000	100	—	Do.	8,000	4 00	....	....	
1859	Galion	O.	25,000	25	—	January & July.	1,800	3 00	....	....	
1858	Galveston	Texas.	150,000	50	—	May & November.	7,000	6 00	....	....	
1854	Gardiner	Me.	100,000	50	4	Do.	8,000	4 00	....	....	
1853	Geneva	N. Y.	75,000	25	2½	Do.	6,000	4 00	....	....	
1851	Germantown	Pa.	Merged	into	the	Philadelphia Works.	12,000	2 25	....	....	
1859	Gettysburg	Pa.	20,000	50	3	January & July.	2,500	4 00	....	....	
1854	Glenn's Falls	N. Y.	35,000	50	3	February & August.	4,000	4 00	....	....	
1854	Gloucester	Mass.	40,000	50	—	January & July.	5,003	3 50	....	....	
1857	Gloversville	N. Y.	15,000	25	—	Do.	3,000	3 50	....	....	
1858	Grand Rapids	Mich.	50,000	20	—	Do.	3,000	4 00	....	....	
1855	Great Barrington	Mass.	5,000	100	5	April & October.	2,000	7 00	....	....	
1849	Great Falls	N. H.	50,000	100	3	Do.	3,000	4 00	....	....	
1860	Greenfield	Mass.	20,000	50	2	January & July.	2,500	4 00	....	....	Close corporation.
1853	Greenpoint	N. Y.	100,000	50	5	Do.	20,000	3 00	....	....	
1859	Greensboro'	N. C.	12,000	50	—	April & October.	3,000	7 00	....	....	
1858	Greensburg	Pa.	30,000	25	3	May & November.	2,000	3 00	....	....	
1854	Hagerstown	Md.	15,000	20	—	January & July.	2,000	6 00	....	....	
	Hamilton	O.	15,000			Do.			....	....	
1859	Hannibal	Mo.	100,000	100	—	Do.	6,000	3 50	....	....	
1857	Harlem	N. Y.	350,000	50	3½	Do.	25,000	3 00	....	145	
1855	Harrisburg	Pa.	100,000	—	4	Do.	5,000	4 00	....	....	
1849	Hartford	Ct.	200,000	25	4	Do.	25,000	3 00	150	140	Stock in demand.
	Hastings	N. Y.				Do.	8,000	4 00	....	....	
1853	Haverhill	Mass.	50,000	50	—	Do.	5,000	4 00	....	....	
1859	Haverstraw	N. Y.	20,000	100	—	Do.	5,000	4 00	....	....	
1861	Hayesville	Mass.	15,000	25		Do.	4,000	4 00	....	....	
1859	Hempstead	N. Y.	16,000	25	—	Do.	1,000	4 00	....	....	
1862	Hoboken	N. J.	100,000	25	3	Do.	30,000	2 50	....	100	Works not yet built.
1856	Hollidaysburg	Pa.	30,000	25	2	Do.	4,000	3 50	....	....	
1861	Holyoke	Mass.	20,000	25	—	Do.	3,000	4 00	....	....	
1861	Homer & Cortlandt	N. Y.	40,000	100	—	Do.	6,000	4 00	....	....	
1854	Honesdale	Pa.	30,000	25	3	Do.	2,500	4 00	....	....	
1860	Hornellsville	N. Y.	12,000	50	—	Do.	2,000	4 00	....	....	
1853	Hudson	N. Y.	50,000	100	3½	February & August.	3,000	4 00	....	....	
	Hunter's Point	N. Y.									
1857	Huntington	Pa.	18,000	50	3	Do.	2,000	3 50	....	....	
1856	Huntsville	Ala.	7,325	25	—	June & December.	2,000	5 00	....	....	
	Indianapolis	Ind.	150,000	—	—	Do.	15,000	5 00	....	....	
1857	Iowa City	Iowa.	40,000	50	—	February & August.	4,000	4 50	....	....	
1852	Ithaca	N. Y.	75,000	25	3½	January & July.	6,000	4 00	....	....	
1857	Jackson	Mich.	25,000	50	5	Do.	6,000	3 50	....	....	
	Jackson	Miss.	80,000	50	—	Do.	4,000	4 50	....	....	
	Jackson	Cal.	50,000	30	—	Do.	4,000	10 00	....	....	
	Jacksonville	Flor.	30,000	20	—	Do.	2,000	7 00	....	....	
	Jacksonville	Ind.	50,000	50	—	Do.	4,000	5 00	....	....	
1858	Jacksonville	Mo.	25,000	25	—	Do.	7,000	6 00	....	....	
1856	Jamaica	N. Y.	20,000	—	4	Do.	6,000	4 00	....	....	
1853	Jamaica Plain	Mass.	78,000	100	3	Do.	3,000	3 00	....	....	
	Jamestown	N. Y.	25,000	—	—	Do.	4,000	4 00	....	....	
1856	Janesville	Wis.	50,000	100	—	Do.	12,000	4 00	....	....	
	Jeffersonville	Md.	30,000	25		Do.	4,000	4 00	....	....	
1853	Jersey City	N. J.	300,000	—	5	Do.	30,000	3 00	150	....	No sales since formation of Hoboken Co.
1858	Jersey Shore	Pa.	15,000	25	—	Do.	2,000	5 70	....	....	
1856	Johnstown	Pa.	80,000	25	3	Do.	8,000	3 00	....	....	
1857	Joliet	Ill.	300,000	100	—	June & December.	6,000	4 00	....	....	
1858	Kalamazoo	Mich.	30,000	50	5	Do.	10,000	4 00	....	....	
1860	Keene	N. H.	60,000	100	—	Do.	4,500	4 00	....	....	
1855	Keokuk	Iowa.	100,000	100	—	January & July.	10,000	4 50	....	....	
1855	Kingston	Pa.	50,000	50	—	Do.	3,000	4 00	....	....	
1859	Kittanning	Pa.	20,000	—	—	Doubtful.	5,000	4 00	....	....	Said to be a fraud.
1854	Knoxville	Tenn.	65,000	—	—	April & October.	4,000	5 00	....	....	
1860	Laconia	N. H.	20,000	100	—	Do.	4,000	6 00	....	....	
1859	La Crosse City	Wis.	100,000	50	—	June & December.	10,000	8 00	....	....	Petroleum and Wood Gas.
1854	Lafayette	Ind.	60,000	50	4	January & July.	10,000	3 25	....	....	
1856	Lambertville	N. J.	30,000	25	—	Do.	2,000	4 00	....	....	
1849	Lancaster	Pa.	100,000	50	4	Do.	10,000	3 00	....	....	
1856	Lancaster	O.	25,000	100	5	Do.	5,000	3 50	....	....	
1855	Lansinburg	N. Y.	25,000	100	—	Private Works.	7,000	4 00	....	....	
1849	Lawrence	Mass.	200,000	100	4	February & August.	15,000	3 50	....	....	
1859	Leavenworth	Kansas.	200,000	25	—	Private Works.	15,000	4 00	....	....	
1856	Lebanon	Pa.	26,000	50	—	February & August.	5,000	4 00	....	....	
1861	Le Roy	N. Y.	25,000	50	—	Do.	4,000	4 00	....	....	
1858	Lewisburg	Pa.	20,000	100	—	January & July.	4,000	4 00	....	....	
1852	Lewiston	Me.	100,000	100	3	Do.	10,000	3 20	....	....	
1856	Lewistown	Pa.	30,000	50	3	April & October.	3,000	3 10	....	....	
1853	Lexington	Ky.	100,000	25	4	January & July.	5,000	4 00	....	....	
1853	Little Falls	N. Y.	112,000	25	—	Do.	3,500	7 00	....	....	
1861	Little Rock	Ark.	20,000	—	—	Do.	5,000	6 00	....	....	
1858	Lockhaven	Pa.	28,000	—	—	Do.	3,000	4 00	....	....	
	Lockport	N. Y.	100,000	50	—	Do.	4,000	4 00	....	....	
	Logansport	Ind.	40,000		5	April & October.	5,000	4 00	105	....	But $461,400 stock has been sold. This Company has a large contingent fund and undivided profit on hand.
1838	Louisville	Ky.	600,000	50	6	January & July.	80,000	2 50	125	....	
1849	Lowell	Mass.	200,000	25	5	Do.	50,000	3 25	....	....	
1852	Lynchburg	Va.	70,000	25	5	Do.	6,000	3 80	....	....	
1852	Lynn	Mass.	55,000	50	4	Do.	20,000	4 00	....	....	
1859	Lyons	N. Y.	30,000	100	—	Do.	4,000	4 00	....	....	
1852	Macon	Ga.	75,160	25	6	Do.	5,000	5 00	....	....	
1851	Madison	Ind.	160,000	25	3	Do.	10,160	3 50	....	....	
1855	Madison	Wis.	100,000	25	—	Do.	5,000	5 00	....	....	
1854	Malden & Melrose	Mass.	50,000	25	3	February & August.	5,000	4 00	....	....	
1852	Manayunk	Pa.	40,000	100	—	Do.	7,000	4 00	....	....	
1852	Manchester	N. H.	100,000	100	5	January & July.	25,000	3 00	....	....	
1830	Manhattan (N. Y. City)	N. Y.	4,000,000	50	5	Do.	600,000	2 50	....	....	
	Mansfield	O.	25,000	—	—	Do.	10,000	4 00	....	....	
1854	Marblehead	Mass.	40,000	100	3	Do.	1,000	4 00	....	....	
	Marlboro'	Mass.	20,000	—	—	Do.	8,000	4 00	....	....	
	Mauch Chunk	Pa.	50,000	50	—	Do.	7,000	4 00	....	....	
1857	Marietta	O.	50,000	50	—	Do.	7,000	4 00	....	....	Stock firm.
1860	Marion	O.	12,000	25	5	April & October.	1,500	13 55	....	....	
1858	Marysville	Cal.	50,000	100	—	January & July.	4,000	2 50	....	....	
1857	Massilon	O.	20,000	25	—	Do.	5,000	3 00	....	....	
1855	Meadville	Pa.	39,000	25	3	Do.	4,000	3 50	....	....	
	Medina	N. Y.	2,000	100	—	Do.	2,000	7 00	....	....	
1852	Memphis	Tenn.	300,000	100	5	June & December.	12,000	5 00	....	....	
	Meriden	Ct.	20,000			Do.			....	....	
1859	Metropolitan (N. Y. City)	N. Y.	1,000,000	100	—	January & July.	200,000	2 50	....	....	
1859	Middleboro'	Mass.	15,000	—	—	Private Works.		6 00	....	....	
1858	Middletown	Ct.	50,000	25	3	March & September.	5,000	3 80	....	....	Owned by G. T. Sutton.
	Middletown	N. Y.		25	—	Private Works.	3,000	3 00	....	....	
	Milford	Mass.	20,000	—	—	Do.		4 00	....	....	
	Milledgeville	Ga.	100,000	50	—	Do.		5 00	....	....	
	Milton	Pa.	10,000			Do.			....	....	
1847	Milwaukee	Wis.	400,000	50	5	January & July.	24,000	3 50	150	....	
1852	Mobile	Ala.	200,000	—	—	Do.	30,000	4 50	....	....	
1836	Monroe	Mich.	40,000	50	—	Do.	5,000	3 50	50	....	
1852	Montgomery	Ala.	100,000	25	4	February & August.	7,000	6 00	....	....	
1856	Montpelier	Vt.	30,000	25	3	January & July.	5,000	4 50	....	....	
1859	Morrisania	N. Y.	80,000	50	—	Do.		4 00	....	....	
1859	Morristown	N. J.	18,000	50	—	Do.	3,500	4 00	....	....	
1854	Mount Holly	N. J.	16,650	25	3	April & October.	2,000	7 00	....	....	
	Mount Vernon	O.	50,000	100	—	Do.		4 00	....	....	
1857	Muscatine	Iowa.	50,000	100	—	January & July.	3,000	4 50	....	....	
1854	Nantucket	Mass.	50,000	100	3	February & August.	6,000	4 00	....	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY & CO., No. 11 BROAD STREET, NEW YORK, SHARE BROKERS.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-Ann'l Div.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1852	Nashua	N. H.	45,000	50	3½	January & July.	10,000	3 50	....	....	
1820	Nashville	Tenn.	260,000	50	5	Do.	25,000	3 50	....	....	
1858	Natchez	Miss.	46,000	50	—	Do.	20,000	5 00	....	....	
	Nevada City	Cal.							....	....	
1852	New Albany	Ind.	200,000	50	3½	Do.	16,000	3 50	....	....	
1846	Newark	N. J.	362,000	50	5	Do.	45,000	3 62	130	....	Always a favorite stock.
1856	Newark	O.	30,000	100	—	Do.	7,000	5 40	....	....	
1852	New Bedford	Mass.	130 000	100	5	Do.	15,000	2 90	102	....	Well managed and kept quiet
1859	Newbern	N. C.	22,000	100	6	Do.	6,000	3 50	....	....	
	New Britain	Ct.	30,000	20	5	Do.	3,000	4 00	....	....	
1851	New Brunswick	N. J.	100,000	20	4	Do.	8,000	3 00	115	....	
1852	Newburg	N. Y.	67,000	20	4	Do.	10,000	4 00	105	....	
1852	Newburyport	Mass.	150,000	10	4	Do.	9,000	4 00	92½	....	
1857	Newcastle	Del.	32,300	10	3	Do.	4,000	4 00	90	....	
1847	New Haven	Ct.	250,000	25	4	Do.	30,000	3 00	155	....	None in market.
1853	New London	Ct.	70,000	50	3	Do.	12,000	4 00	105	....	
1835	New Orleans	La.	1,500,000	100	6	Do.	120,000	4 00	180	....	
1853	Newport	R. I.	130,200	100	4	Do.	10,000	3 50	112	....	
1854	Newton & Watertown	Mass.	92,000	100	2	Do.	10,000	4 00	....	....	
	Newton	N. J.	30,000	—	—	Do.	3,000	4 00	....	....	
	Newton	Pa.	20,000	50	—	Do.	2,500	4 00	....	....	
	Newtown	N. Y.									
1823	New York	N. Y.	1,000,000	50	5	May & November.	100,000	2 50	300	....	
1859	Niagara Falls	N. Y.	15,000	25	—	Do.	3,000	4 00	90	....	
	Norfolk	Va.	60,000	25	—	Do.	40,000	4 00	....	....	
1853	Norristown	Pa.	41,700	25	4	June & December.	8,000	3 50	....	....	
1855	North Attleboro'	Mass.	50,000	100	3½	Do.	6,000	4 00	....	....	
	Northern Liberties	Pa.	400,000	25	7	City Works.	40,000	2 50	....	....	
	North Adams	Mass.	25,000	—	—	March & September.	30,000	4 00	....	....	
1856	Northampton	Mass.	35,000	25	3	January & July.	4 500	4 00	....	....	
1859	North Bridgewater	Mass.	16,000	100	4	June & December.	1,000	7 00	....	....	
1856	Norwalk	Ct.	30,000	150	4	February & August.	6,000	4 00	....	....	
1859	Norwalk	O.	30,000	25	—	January & July.	4,000	4 00	....	....	
1854	Norwich	Ct.	75,000	25	3½	Do.	12,000	3 50	....	....	
1861	Norwich	N. Y.	12,000	50	—	Do.	2,500	4 00	....	....	
1859	Nyack	N. Y.	20,000	100	—	Do.	2,500	4 00	....	....	
1860	Oberlin	O.	10,000	—	—	Do.	1,200	4 00	....	....	
1855	Ogdensburg	N. Y.	75,000	50	5	Do.	9,000	4 00	....	....	
1859	Orange	N. J.	65,000	25	—	Do.	6,000	3 50	....	....	
1852	Oswego	N. Y.	81,250	100	3½	Do.	15,000	4 00	105	....	
1855	Ottawa	Ill.	45,000	100	6½	Do.	6,000	4 00	....	....	Good works, built by Hoy, Jr., & Kennedy.
1856	Owego	N. Y.	40,000	50	3½	Do.	5,000	4 00	....	....	
1860	Owensboro'	Ky.	25,000	25	—	Do.	4,000	3 50	....	....	
1856	Paducah	Ky.	75,000	100	—	May & November.	4,000	5 00	....	....	
1861	Painsville	O.	40,000	25	5	Do.	2,500	5 00	....	....	
1856	Palmyra	N. Y.	12,000	25	—	January & July.	3,000	7 00	....	....	
1847	Paterson	N. J.	125,000	25	3	Do.	20,000	3 50	95	....	
1850	Pawtucket	R. I.	75,000	50	4	Do.	12 000	3 00	....	....	
1855	Peekskill	N. Y.	31,000	50	3	June & December.	4,000	4 00	....	....	Surplus $10,000, May 15, 1863.
1860	Penn Yan	N. Y.	12,000	50	5	Do.	3,000	4 00	....	....	Works leased to Gilbert T. Sutton.
1859	Peoples', Chicago	Ill.	500,000	50	New	Do.	100,000	2 50	....	....	
1855	Peoria	Ill.	100,000	50	4	Do.	8,000	3 50	....	....	What is this Company doing?
1852	Petersburg	Va.	120,000	—	5	January & July.	20,000	3 80	....	....	
1841	Philadelphia	Pa.	3,000,000	50	—	City Works.	650.000	2 50	....	....	
1855	Piqua	O.	50,000	50	—	January & July.	6,500	4 00	....	....	
1835	Pittsburg	Pa.	300,000	100	5	Do.	60,000	1 50	115	....	
1854	Pittsfield	Mass.	50,000	100	5	Do.	4,500	4 00	....	....	
1858	Placerville	Cal.	30,000	50	—	Do.	4,500	10 00	....	....	
1860	Plainfield	N. J.	25,000	50	—	Do.	2,500	4 00	....	....	
1859	Plattsburg	N. Y.	16,000	50	—	January & July.	5,000	7 00	....	....	
1853	Plymouth	Mass.	40,000	100	—	April & October.	8,000	4 00	....	....	
1860	Port Chester	N. Y.	50,000	50	—	Do.	4,000	4 00	....	....	
1860	Port Jervis	N. Y.	20,000	100	—	Do.	3,000	4 10	....	....	
1849	Portland	Me.	300,000	50	4	January & July.	30,000	3 00	....	....	
1859	Portland	Oreg.	50,000	50	—	Do.	3,500	8 00	....	....	
1859	Port Lavacca	Texas.	50,000	100	—	Do.	2,500	7 00	....	....	
1851	Portsmouth	N. H.	70,000	100	8	April & October.	6,500	3 70	....	....	
1855	Portsmouth	O.	50,000	50	4	January & July.	10,000	3 50	....	....	
1855	Portsmouth	Va.	100,000	50	4	Do.	4,000	4 00	....	....	
1856	Pottstown	Pa.	20,000	50	3	Do.	3,500	4 00	....	....	
1850	Pottsville	Pa.	110,000	50	2	Do.	10,000	3 50	....	....	
1850	Poughkeepsie	N. Y.	84,000	25	4	March & September.	15,000	3 50	120	110	
1848	Providence	R. I.	1,000,000	50	4	January & July.	60,000	3 00	122	....	
1858	Quincy	Ill.	300,000	50	4	June & December.	12 000	3 50	....	....	
	Quincy	Mass.	00,000	00	—	Do.	00,0 0	0 00	....	....	
1855	Racine	Wis.	43,500	26	—	Do.	7,000	3 50	....	....	
1857	Rahway	N. J.	50,000	20	—	January & July.	5,000	4 00	....	....	
1858	Raleigh	N. C.	25,000	100	6	May & Novrmber.	5,000	6 00	....	....	
1848	Reading	Pa.	100,000	25	4	January & July.	25,000	3 00	....	....	
1851	Richmond	Va.	341.975	—	—	City Works.	30,000	3 00	....	....	Jeff. Davis has extinguished the gas-lights of Richmond, Va.
1859	Richmond	Mass.	40,000	25	—	January & July.	3,000	4 00	....	....	
	Richmond County	N. Y.									
1859	Ripley	O.	25,000	50	—	April & October.	2,000	4 00	....	....	
1852	Rochester	N. Y.	200,000	50	5	January & July.	50,000	2 50	....	....	
1857	Rockford	Ill.	40,000	50	—	Do.	4,000	4 00	....	....	
1854	Rock Island	Ill.	100,000	50	—	Do.	6,000	4 50	....	....	
1854	Rockland	Me.	50,000	100	—	Do.	6,000	4 40	....	....	
1852	Rome	N. Y.	35,000	100	3½	Do.	10,000	3 60	....	....	
1854	Rondout and Kingston	N. Y.	65,150	20	3½	June & December.	10,000	3 80	....	....	
1854	Roxbury	Mass.	150,000	100	5	January & July.	20,000	3 00	....	....	
1859	Rutland	Vt.	20,000	25	—	Do.	4,000	3 50	....	....	
	Saco	Me.	71,600	100	3½	April & October.	8,000	4 00	....	....	
1857	Sacramento	Cal.	500,000	100	—	Do.	40,000	10 00	....	....	
1859	Sag Harbor	N. Y.	20,000	—	—	Do.	4,000	4 00	....	....	
1858	Saint Albans	Vt.	15,000	20	—	Do.	3,000	7 00	....	....	
	Saint Johnsbury	Vt.	30,000	25	—	Do.	4,000	4 00	....	....	
1857	Saint Joseph	Mo.	50,000	100	5	January & July.	6,000	5 00	....	....	
1859	Saint Louis	Mo.	600 000	50	—	June & December.	180.000	3 50	....	....	
1857	Saint Paul	Min.	200,000	50	3	January & July.	10,000	6 00	....	....	Surplus $10,000, May 15, 1863.
1856	Salem	N. J.	30,000	25	3	Do.	5,000	3 86	....	....	
1850	Salem	Mass.	200,000	100	4	February & August.	30,000	3 24	....	....	
1859	Salem	O.	25,000	20	—	Do.	3,000	3 00	....	....	
1859	Salisbury	N. C.	14,600	50	6	May & November.	3,500	6 00	....	....	
	Salisbury Mills	Mass.	1,250	25	—	Do.	3,000	4 00	....	....	
	Salmon Falls	Me.	25,000	100	—	Do.	3,000	4 00	....	....	
	San Antonio	Texas.	75,000	20	—	Do.	40,000	6 00	....	....	
1854	Sandusky	O.	75,000	50	—	April & October.	9,000	3 00	....	....	
1859	Sandwich	Mass.	10,000	—	—	Private Works.	2,000	3 50	....	....	
1852	San Francisco	Cal.	2,000,000	100	4½	Do.	100,000	6 50	100	....	
	San Jose	Cal.							....	....	
1858	Saratoga Springs	N. Y.	39,000	100	—	January & July.	6,000	3 60	70	....	
	Saugerties	N. Y.	30,000	20	—	Do.	4,000	3 00	....	....	
1849	Savannah	Ga.	200,000	25	5	Do.	10,000	3 75	....	....	
1851	Schenectady	N. Y.	50,000	—	—	Private Works.	11,000	4 00	....	....	
1858	Scranton, Gas and Water	Pa.	100,000	25	—	January & July.	6,000	3 80	....	....	About trying Water-Gas.
1857	Selma	Ala.	20,000	100	—	Do.	2,000	5 00	....	....	
1856	Seneca Falls and Waterloo	N. Y.	80,000	50	3	Do.	10,000	4 00	100	....	
	Shreveport	La.	40,000	25	—	Do.	3,000	0 50	....	....	
1856	Sing Sing	N. Y.	40,000	100	—	Do.	3,000	3 50	....	....	
	Smyrna	Del.						4 00	....	....	Petroleum Gas.
1860	South Adams	Mass.	10,000	25	—	Do.	3,000	4 00	....	....	
1859	South Bridge	Mass.	5,000	25	—	Do.	4,010	6 00	....	....	
	South Boston	Mass.	200,000	50	—	Do.	60,000	3 25	110	....	
	Springfield	O.	200,000	100	—	Do	20,000	3 50	....	....	
1854	Springfield	Ill.	75,000	50	—	January & July.	10,000	3 50	....	....	
1848	Springfield	Mass.	100,000	500	5	February & August.	10,000	3 60	140	....	
1855	Stamford	Ct.	6,250	25	5	April & October.	3,000	3 50	....	....	
1857	States Islan	N. Y.	150,000	50	5	January & July.	26,000	4 00	95	....	

GAS-LIGHT COMPANIES IN THE UNITED STATES.—Continued.

Compiled from official sources expressly for the AMERICAN GAS-LIGHT JOURNAL.

CORRECTED BY JOHN B. MURRAY & CO., No. 11 BROAD STREET, NEW YORK, SHARE BROKERS.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1858	Staunton	Va.	18,000	50	6	January & July.	4,000	7 00	....	....	
	Steubenville	O.	150,000	100	—	Do.	15,000	4 00	....	....	
	Stockton	Cal.	50,000	—	—	Do.	8 000	10 00		....	
1848	Syracuse	N. Y.	125,000	25	5	March & September.	25,000	3 00	112	....	
	Tamaqua	Pa.	40,000	25	—	Do.	3,000	4 00			
1859	Tarrytown and Irvington	N. Y.	70,000	50	—	January & July.	3,000	4 00	....	....	
1853	Taunton	Mass.	100,000	50	4	Do.	10,000	4 00	....	....	
	Terre Haute	Ind.	100,000	100	—	Do.	3,000	4 00	....	....	
	Thompsonville	Ct.	25,000	50	—	Do.	4,000	4 50	....	....	
	Tiffin	O.	25,000	20	—	Do.	4,000	4 00	....	....	
1853	Toledo	O.	100,000	50	3	Do.	8,000	3 50	....	....	
1847	Trenton	N. J.	100,000	20	4	Do.	15,000	3 42	....	110	
1848	Troy	N. Y.	200,000	100	4	June & December.	35,000	3 00	160	....	
1856	Urbana	O.	30,000	25	—	April & October.	3,500	4 00	....	....	
1849	Utica	N. Y.	80,000	100	4	Do.	22,000	3 60	....	....	
1858	Vicksburg	Miss.	66,000	50	—	March & September.	4,000	4 50	....	....	
1859	Vincennes	Ind.	25,000	100	—	January & July.	2,000	4 00	....	....	
1863	Virginia City.	N. T.					20,000				
1858	Walden	N. Y.	2,500	—	—	Private Works.	1,000	6 00	....	....	
1853	Waltham	Mass.	100,000	100	4	January & July.	3,000	4 00	....	....	
1857	Ware	Mass.	30,000	20	—	Do.	3,500	4 00	....	....	
1861	Warren	O.	30,000	50	—	Do.	4,000	3 00	....	....	
1854	Warren	R. I.	20,000	25	—	Do.	3,000	4 00	....	....	
1855	Washington	D. C.	500,000	20	5	Do.	50,000	2 61	....	100	
1859	Washington	N. C.	15,000	100	—	April & October.	1,500	6 00	....	....	
1848	Washington	Pa.	20,000	25	4	January & July.	4,000	3 00	....	....	
1854	Waterbury	Ct.	100,000	25	—	Do.	4,000	4 00	....	....	
1852	Waterford	N. Y.	12,000	25	—	Do.	4,000	4 00	....	....	
1852	Watertown	N. Y.	20,000	100	—	Do.	10,000	7 00	....	....	
1856	Watertown	Wis.	25,000	100	—	Do.	5,000	5 00	....	....	
1858	Wautoma	Wis.	30,000	50	—	Do.	3,000	4 50	....	....	
1857	Waverly	Miss.	20,000	100	—	April & October.	4,000	5 00	....	....	
1854	West Cambridge	Mass.	60,000	100	—	February & August.	10 000	4 00	....	....	
1852	Westchester	Pa.	100,000	25	2½	Do.	8,500	3 50	....	....	
	Westfield	Mass.	25 000	100	6	Do.	4,000	4 00	....	....	
	Weston	O.	20,000	25	—	Do.		5 00	....	....	
1857	West Point	N. Y.	50,000	—	—	United States Military	Academy.	2 00	....	....	
1853	West Troy	N. Y.	100,000	50	3	January & July.	10,000	3 60	85	....	
1850	Wheeling	Va.	75,000	25	6	Do.	12,000	2 70	....	....	
	White Plains	N. Y.	20,000	20	—	Do.			....	....	
1856	Wilkesbarre	Pa.	50,000	50	—	May & November.	4,000	3 33	100	80	
1850	Williamsburg	N. Y.	1,000,000	50	5	January & July.	60,000	3 00	....	....	
1858	Williamsburg	Va.	30,000	25	—	Do.	3,000	4 00	....	....	Camp-fires of the Union Army light up this place at present.
1857	Williamsport	Pa.	70,000	25	4	Do.	3,500	3 80	....	....	
1859	Willimantic	Ct.	12,000	—	—	Do.	2,500	3 50	....	....	
1853	Wilmington	N. C.	60,000	50	5	Do.	8,000	5 00	....	....	
1852	Wilmington	Del.	200,000	50	5	February & August.	20,000	3 00	....	....	
1854	Winchester	Va.	36,000	50	6	January & July.	5,000	4 00	....	....	
1861	Windsor	Vt.	20,000	25		Do.	2,000	6 00			Make Petroleum Gas.
	Woburn	Mass.	20,000	—	—	Do.	3,000	4 00	....	....	
1856	Woodstock	Vt.	10,000	50	4	Do.	4,000	6 00	....	....	
1853	Woonsocket	R. I.	82,000	100	4	April & October.	4,000	3 50	....	....	
1856	Wooster	O.	25,000	50	—	January & July.	6,000	3 00	....	....	
1849	Worcester	Mass.	160,000	100	5	Do.	15,000	3 50	....	....	
1855	Xenia	O.	40,000	50	—	Do.	3,000	4 00	....	....	
1854	Yonkers	N. Y.	100,000	50	3½	Do.	10,000	3 50	110	16½	
1849	York	Pa.	40,000	57	3	June & December.	10,000	3 50	....	....	
	Yorkville	S. C.	20,000	25	—	Do.	4,000	4 00	....	....	
1858	Ypsilanti	Mich.	20,000	50	5	February & August	6,000	14 00	....	....	
1850	Yreka	Cal.	30,000	100	—	Do.	2,000	0 00	....	....	
1848	Zanesville	O.	44,600	25	4	Do.	10,000	3 00	....	..	

GAS-LIGHT COMPANIES IN THE BRITISH PROVINCES OF NORTH AMERICA.

When Chartered.	Town.	Province	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
1854	Belleville	C. W.	33,040	100	4	January & July.	1,200	5 00	....	....	
1854	Brantford	C. W.	32,000	100	2¼	Do.			....	....	
	Brockville	C. W.	50,000	—	—	Do.	5,000	4 00	....	....	
	Chatham	N. B.	50,000	—	—				....	....	
1854	Charlotte Town	P. E. I.	50,000	100	5	Do.	3,000	3 50	....	....	
1857	Cobourg	C. W.	30,000	—	-	February & August.	4,000		....	....	
	Dundas	C. W.	30,000	—	—	Do.	6,000	4 00	....	....	
	Frederick	N. B.	50,000	—	—	Do.			....	....	
1843	Halifax	N. S.	160,000	40	7	May.	30,000	3 00	....	....	
1850	Hamilton	C. W.	125,000	40	5	March & September.	20,000	3 50	....	....	
1848	Kingston	C. W.	80,000	100	—	Do.	6,000	3 50	....	....	
1853	London	C. W.	100,000	20	5	May & November.	5,000	5 00	....	....	
1847	Montreal	C. E.	460,000	40	—	March & September.	110,000	2 80	....	118	Last sale at this figure.
1854	Ottawa	C. W.	40 000	40	5	Do.	5,000	4 50	....	....	
1859	Point Levi	C. E.	25,000	25	—	January & July.	4,000	3 50	....	....	
1859	Port Hope	C. W.	28,000	20	4	May & November.	4,500	3 50	....	....	
1847	Quebec	C. E.	200,000	200	4	January & July.	60,000	3 00	....	....	
1848	Saint Catherine's	C. W.	80,000	20	—	May & November.	7,000	4 50	....	....	
1859	Saint Hyacinthe	C. E.	15,000	20	—	Do.	4,000	4 00	....	....	
	Saint John	N. B.	170,000	85	4	June & December.	25,000	3 00	110	110	Sales at this figure.
	Saint John's	N. F.	50,000	—	4	Do.	30,000		....	....	
1858	Sorel	C. E.	14,000	20	4	Do.	4,000	3 00	....	....	
1848	Toronto	C. W.	400,000	50	—		50,000	3 00	....	....	This Co. pay a quarterly div. of 2 per ct.

GAS-LIGHT COMPANIES IN CUBA, MEXICO, SOUTH AMERICA AND NEW ZEALAND.

When Chartered.	Town.	State.	Chartered Capital.	Par Val. per Sh. $	Semi-An'l Div'd.	Dividends Payable.	Population of Gas District.	Price per 1000 Feet.	Asked pr. cent.	Offered pr. cent.	REMARKS.
	Callao	Chile.		—	—	January & July.	20,000	7 00	....	....	
	Cardenas	Cuba.	50,000	—	—	Do.	180,000	5 00	....	....	
1857	Compania Cubana	Hav'a.	500,000	500	10	Do.			....	....	
	Cienfugos	Cuba.		—	—	Do.	12,000	5 00	....	....	These four towns are lighted by the Compania Cubana of Havana.
	Guanabacoa	Cuba.		—	—	Do.	14,000	5 50	....	....	
	Regla	Cuba.		—	—	Do.	10,000	5 00	....	....	
	Trinidad	Cuba.		—	—	Do.	16,000	5 00	....	....	
	Guiness	Cuba.		—	—	Do.			....	....	
	Guyaquil	S. A.	150,000	—	—	Do.	25,000		....	....	
	Havana	Cuba.	2,000,000	500	—	Quarterly.	200,000	5 00	....	175	
	Lima	Peru.	100,000	—	—	January & July.	150,000		....	....	
	Maranham (Chartered)			—	—	Do.			....	....	
	Matanzas	Cuba.	50,000	—	—	Do.	180,000	8 50	....	....	
	Mexico City	Mex.	550,000	—	—	Do.			....	....	
	Montevideo	S. A	500,000	—	—	Do.			....	....	
	Para (Chartered)			—	—	Do.			....	....	
1854	Rio de Janeiro	S. A.	1,000,000	500	7½	Do.	300,000	4 00	....	....	
	San Iago	Chile.	500,000	—	—	Do.	180,000	7 00	....	....	
1857	Saint Jago de Cuba	Cuba.	450,000	500	—	Do.	25 000	5 00	....	....	
	Valparaiso	Chile.	500,000	—	—	Do.	85,000	6 00	....	....	
	Vera Cruz	Mex	500,000	—	—	Do.			....	....	
	Vi le Clara	Cuba.	50,000	—	—	Do.			....	....	
	Auckland	N. Z.		—	—	Do.			....	....	

WATER WORKS OF AMERICA.

BALTIMORE, MD.

Report of the Water Board of Baltimore.

OFFICE OF THE WATER BOARD,
Baltimore, January 22d, 1864.

To the Honorable, the Mayor and City Council:

Gentlemen—The Commissioners of the Water Board herewith present their annual report for the year 1863.

The waterworks having been carefully inspected by the engineer, on several occasions during the year, are found in good condition. The supply of water has been abundant, and during the greater part of the year, has been delivered pure and clear; but the Commissioners regret that during the fall and winter the frequent rains have given the water an unnatural color, causing great annoyance to all concerned. A remedy has already been provided, and the largely increased storage capacity will effectually prevent a recurrence of this cause of complaint. The two reservoirs now in use contained a sufficient quantity of clear water to last for two weeks, but when the freezing weather of December set in, hydrants in every direction were kept running day and night. The engineer perceived that in case of a heavy rain, the contents of the reservoirs would be exhausted in a few days, and warned the people by advertisements in the newspapers and by personal remonstrance from himself and his men, all of which were unavailing, and the supply of clear water was wasted in the course of a week, and the result shown by blockading the gutters and pavements with great quantities of ice. No alternative was left but to turn on the water in an unsettled condition from Swann Lake. Several hundred supplies were stopped off on account of the bursting of service pipes during the first two weeks of January.

The work of the year has been unusually expensive in laying a large extent of distributing mains, $37,586 05 having been expended for this purpose. There were several points in the eastern and northeastern sections of the city which could not be supplied from the low service reservoir. For several years past, numerous applications have been made to introduce water from the high service reservoir. The heavy expense, without remunerating returns, has heretofore prevented this desirable improvement. In the early part of the year, applications were made to lay a line of mains from the high service in a northeastwardly direction on the Bel Air Avenue, to a point near the eastern boundary, to supply several manufacturing establishments and other buildings on the line. The new Alms House could not be supplied from the low service reservoir, from which the pipes are now laid, extending eastwardly to Canton. An agreement having been made to supply the Alms House, at a moderate sum per annum, a line of mains was begun in the summer, extending from the Hampden reservoir, through Point Lane to Patterson's Park. From thence it will be continued to the Alms House, and will furnish water in every part of the building. This heavy outlay for distributing mains will complete a system for the supply of every section of the city, and hereafter but little expense will be needed to deliver water from the high service reservoir in any part of the city. A large quantity of 16, 18, and 30 inch mains leading from the old reservoir and the pump house, in all about twenty thousand feet in length, have been taken out of the ground, and used for this eastern extension. They are larger than would be necessary, but are used with advantage where pipe of less size would answer the purpose. The large quantity of lead used many years ago in laying the old mains, saves considerable expense in this article at a time when the price of lead is twice as much as it was a few years ago.

The extension of water mains involves an increased outlay for fire plugs, the law requiring one in each square as far as mains are laid. Fifty-five new fire plugs were set last year, and $1,609 40 were expended for repairs, the cost of these exceeded the appropriation for 1863, and $6,000 will be required to comply with the law for the present year.

The appropriation for repairs of pumps is entirely inadequate. Two thousand dollars were appropriated last year; three hundred and seventy-six pumps were repaired, at an average cost of six dollars and fifty cents, many of them are old and dilapidated, and the expense of keeping them in repair increases every year. Some have supposed that the Water Board do not keep the pumps in good order, to induce people to use the hydrant water. Such is not the fact. The engineer keeps a book in his office where any person may report pumps which need attention, and repairs are ordered every day; many of the pump stocks are decayed and are actually unfit for use; to renew them would require a much larger appropriation.

The report of the Water Engineer, presented herewith, furnishes information in relation to the Water Works, together with numerous statements in reference to his department, to which we beg leave to refer for further particulars.

Samuel Hinks, Esq, resigned his position as Water Registrar in August, on account of feeble health; Dr. George Merryman was appointed in his place, and took charge on the 1st of September.

The revenue from the works has been applied to the payment of the interest on the water stock debt and the current expenses for each year since the works were purchased by the city. The stock debt is now $3,500,000, requiring $210,000 annually for the interest, the balance of revenue over the amount of the interest on the stock debt, is applied to pay the current expenses and repairs. If these were the only items of expense the revenue would now leave from $20,000 to $30,000 per annum to be applied to the extinguishment of the funded and floating debt; but the outlay for distributing mains and other improvements prevent any considerable sum from being applied for the extinguishment of the debt; $37,580 05 were expended in 1863 in the extension of mains, and more than this sum will be expended for the same purpose in 1864.

The land known as the Old Mount Royal Reservoir, the Pump House property, the Rock Mill and the Hamilton Mill have been sold, for the aggregate sum of $50,750, on which there have been paid $22,750. Leaving unsold the Chase Reservoir land, and sixteen to eighteen acres on the Falls Road, at the entrance to the lake, and the Mount Royal and Rural Mills. The proceeds of sales of the surplus land are appropriated to the payment of the floating debt of the Water Department.

By reference to a statement of the General Ledger in the Registrar's Report, the profit and loss account shows a balance of $177,206 47, and that there is a balance on bills payable of $100,000, and due the City Register, $87,297 29, exclusive of $30,585 38 drawn on account of appropriation for Lake Chapman, making the indebtedness of the department, December 31, 1863, $364,503 76. The item of profit and loss is made by charging that account with interest on the stock debt and the general expenses, and crediting the account with the revenue. It embraces the whole period from the year 1857 to the first of January, 1864. To meet this indebtedness, the land yet to be sold is estimated by some at $200,000, and there is due $106,500 on account of rents, tax, and water bills.

The estimate of income for rents and taxes for the year 1864, taken from the books of the Department, and for which bills have been made and delivered, is $247,107 88, and for revenue other than water rents and taxes, and new supplies which may be made within the year, will make the revenue for the year 1864 approximate the sum of $260,000. By an arrangement recently adopted by the Water Registrar, bills due have been more promptly paid than heretofore. This course will be pursued vigorously, and, it is hoped, will be attended with greater success. The report of the Water Registrar is also herewith submitted, to which you are respectfully referred.

In March last the City Council directed the Water Board to confer with the Park Commissioners in relation to forming a lake to cover an area of one hundred acres to be used for a supply of water at any future time. The Board had several conferences with the Park Commissioners on the subject. Attention was directed to the point indicated by the City Council, but it was found impracticable to construct a lake of such dimensions in the Druid Hill Park. A site southeast of the Park gate was surveyed extending down a deep ravine, admirably adapted to the purpose, and an estimate of the cost of constructing a lake to extend several hundred feet within the Park enclosure was made. The first estimate was for a lake to contain three hundred millions of gallons, but when it was found that its capacity could be increased to upwards of five hundred millions at about one-fifth more cost, plans, and estimates were made for a lake which will contain five hundred and four millions of gallons, which will be increased nearly one hundred millions by excavation for the dam; the estimated cost of construction is $1,871 35. The land purchased by private sale and condemnation will cost, exclusive of the one-fourth interest in sixty-seven acres owned by the city for the use of the Park, $111,065. A survey and estimate was made for a lake at Woodbury, on the northeastern boundary of the Park, but it was found that the ravine at Woodbury would not admit of the construction of a lake to contain over two hundred and eighty millions of gallons. This site had many advantages, but the pressing necessity to provide an ample supply and the general desire to have the improvement projecting from the Park towards the city, induced the Board to decide in favor of the southern site. One hundred and five acres of land have been secured, and by an arrangement made with the Park Commissioners, several acres on the margin of the lake will be appropriated as part and parcel of the Park. This lake, when finished, will furnish a supply for the city without replenishing it for sixty days or more. It is intended to deliver all the water by a current through the new lake to keep it constantly in motion and to preserve its purity when the water is clear in Swann Lake, and after heavy rains the water from the upper lake will be turned into the Falls without polluting that in Lake Chapman.

The Commissioners have commenced clearing the land and are making preparation to prosecute the work without delay as soon as the weather will admit. On account of the scarcity of laborers the Board have purchased a steam excavator similar to one used on the Northern boundary avenue a few years ago, which the Board has seen in successful operation. A locomotive engine has been secured and a temporary railway track will be laid immediately; by the use of these appliances the immense bulk of earth forming the dam will be moved expeditiously. As every preparation is now in progress, the Board hope to be able to finish the work within the ensuing two years.

Respectfully submitted,

JOHN LEE CHAPMAN, *President.*
JOHN W. RANDOLPH, *Secretary.*
EVAN T. ELLICOTT,
F. LITTIG SHAFFER,
JOHN B. SEIDENSTRICKER,
GERARD T. HOPKINS,
FRANCIS T. KING.

ENGINEER'S REPORT.

To the President and Members of the Water Board:

Gentlemen—I submit for your consideration the annual report of the Water Engineer's department, for the year 1863, giving a detailed account of the labor performed, and also a statement of the condition of the works under my care.

Purity of the Water.

Every possible effort has been used to keep the water pure and limpid. Three times during the year the pipes have been washed out, and both reservoirs emptied and cleaned out, and at no time has any nuisance of any kind been found in the water, of either the Lake, Aqueduct, or Reservoirs. In consequence of the limited storage capacity of the reservoirs, after heavy rains the water has been slightly discolored, much less so, however, than in the previous year. As the storage of the reservoirs is only about ten days' consumption, after continuous rains we must have muddy water until the completion of the new storage lake, which, we believe, will be a final remedy.

Swann Lake.

The work of rip-rapping the margin has been steadily progressing through the season. There now remains but about one-fifth of the embankments to be secured by stoning. One more season will complete the whole of this tedious and expensive work. The whole of the embankments are now well sodded and secured against wash. Some improvements have been made to the hill on the west side of the lake, opposite to the cottage, in ploughing the ground, re-setting in grass, planting trees and in a coat of manure, which

will remove the annoyance of washings after heavy rains.

An addition has been made to the cottage, which has proved very useful and adds much to its appearance.

The embankments on the side of the Western Maryland Railroad have been widened, and the whole lake is now enclosed by a good, substantial post and rail fence.

The late purchase of the grove near the cottage seems to render it necessary that some improvement should be made to the spring. It is found after heavy rains large quantities of sand are washed into the lake from the tributaries, and thereby filling it up, to some extent. I recommend that breakwaters be built as near the lake as convenient, across the various streams emptying into the lake, which will remedy the evil to some extent.

All the machinery, dam, embankments, &c., are in good order.

There was a continuous flow of water over the dam throughout the entire year.

The Aqueduct.

The aqueduct was carefully inspected its entire length in April last, and found to be in good condition, no settlements, cracks, or loosening of the bricks could be discovered; that portion lying between the lake and the waste weir at the Harper's estate has been cleansed three times during the year, the lower portion cannot be so readily cleansed, but it has been washed out. An improvement has been made to the house at the waste weir so as to admit light and air.

All the man-holes are covered by a large stone which effectually excludes light and air from the aqueduct; if a thirty inch pipe set on end was substituted for the stone covering it would be a great improvement, and render the examination perfectly safe and more effective than at present.

Hampden Reservoir

Was emptied out and examined and found to be in good order; the grounds around the reservoir need some improvement; as the soil was taken off in the building of the reservoir, the land is too poor to grow a sod, it needs manure in order to save the embankments; no money has been expended on this reservoir this year.

The Mount Royal Reservoir was emptied and the self-acting valve was removed, trees have been planted around the reservoir, and a good top dressing of manure put on the banks; the fountain house should be painted before warm weather; it would add much to the appearance of the property if the lot on North avenue and the one in the rear were filled and enclosed with the reservoir lot.

The repairs during the year have been about an average for the last two or three years, except the large mains, which have given less trouble than usual, none of the 30-inch mains have caused any expense, except at North and Madison streets, at the crossing of the railroad, which have loosed the joints on two occasions; the whole number of repairs made, is:

Main leaks	276
Main stops	120
Fire-plugs	146
Hydrant and service pipes	1,937

I have removed of old mains out of use 119 feet of 6-inch pipe, 765 feet of 12-inch, 819 feet of 16-inch, 864 feet of 18-inch, 1,206 feet of 20-inch and 90 feet of 30-inch, there still remains about 2,000 feet of 16-inch pipe from the Chase Reservoir to the Richmond Market, and a line of 30-inch from the old Mount Royal Reservoir to the Rock Mill, which will be removed as soon as practicable.

I have repaired 376 pumps. If it is desirable that the pumps of good water should be kept in good order it will require that a number of the old stocks should be removed and new ones substituted; the repairs which have been made have been very limited, as the appropriation would not justify more extensive repairs; nearly five hundred dollars have been expended at the corner of Wolf and Gough streets, on an artezian well and very fine water, the neighbors being very anxious it should be preserved, but the shaft terminating in quicksand, the sand finds its way into the cylinder, and the water is thereby discolored, therefore, the well must be abandoned and a new well sunk in order to gratify the neighbors.

The mains laid during the year have been principally extensions—early in the season a main was extended west on Baltimore street beyond the city limits to the House of Refuge, and on the Belair avenue north of the city limits, thereby extending the benefits of the water to the extreme sections of the city, the high points east of Jones' Falls have suffered for want of the high service, a main is now being laid from the northwest city boundary to Charles street avenue, thence north to York road, and by Point lane to Bond street, to Monument, to Chester, to Baltimore, to Gist, to Eastern avenue, thence to the new Almshous; when this main shall be completed no more large mains will be required for many years, as all portions of our city may be supplied either from the low service, 150 feet, or from the high service, 217 feet above tide.

The following new supplies have been made in 1863: 340 at $5; 19 at $6; 402 at $7.50; 16 at $8; 337 at $9; 44 at $10; 121 at $12; 49 at $14; 61 bath; 22 water-closets; 72 hose; 913 horses; 41 carriages; 43 cows; and special rate—1 at $35; 1 at $250; 1 at $135; 1 at $45; 1 at $60; 4 at $20; 5 at $15; 3 at $16; 1 at $585; 2 at $30; 4 at $75; 1 at $300; 4 at $3; 9 at $25; 3 at $4.50; 1 at $190; 4 at $24; 1 at $80; 5 at $50; 1 at $35; 1 at $64; 1 at $37; 1 at $37.50; 1 at $85; 2 increased rates at $15; 1 at $25; 1 at $60; 1 at $70, and for building purposes; 1 at $7.35; 1 at $32.40; 1 at $75; 1 at $18; 1 at $16.25; 1 at $13.72; 1 at $27; 2 at $7.50; 1 at $3; 1 at $72; 1 at $12; 1 at $60. Total number of new supplies, 1,385. Total amount of revenue, $16 088 72.

Also add by extension of the mains 112 buildings to be taxed for 1864.

I have handed to the water registrar bills amounting to $14,273 26 for work done and materials by plumbing department; and for old materials sold $701.88; for fire-plugs $5,000; for repairs of pumps $2,000; for extension of the main pipe to the House of Refuge $2,500. There have been by orders from the registrar, supplies stopped of 725, re-opened 684, and drew 75 ferrules.

Respectfully submitted,
J. S. Suter, Water Engineer.

Estimated Revenue from Water Rents and Taxes for 1864.

WATER RENTS.

2,338	Houses	@ $5 00	$11,690 00	
4,361	"	@ 7 50	32,707 50	
5,663	"	@ 9 00	50,957 00	
3,466	"	@ 12 00	41,592 00	
2,369	"	@ 14 00	33,166 00	
144	"	@ 6 00	864 00	
233	"	@ 8 00	1,864 00	
471	"	@ 10 00	4,710 00	
				$177,560 50
3,891	Baths	@ 2 00	6,782 00	
1,118	Water Closets	@ 2 00	2,236 00	
1,276	Horses	@ 1 50	1,914 00	
537	Carriages	@ 1 50	805 50	
370	Hose	@ 3 00	1,110 00	
161	Cows	@ 1 00	164 00	
				13,011 50

SPECIALS.

505	Special supplies		31,451 88	
50	Extra families	@ 2 00	100 00	
				31,551 88

WATER TAX.

10,262	Houses	@ 1 00	10,262 00	
3,310	"	@ 2 00	6,620 00	
1,184	"	@ 3 00	3,552 00	
910	"	@ 5 00	4,550 00	
				24 984 00
	Total			$247,107 88

APPENDIX.

During the construction of the Swann Lake much anxiety was felt as to the effect that might be produced on the health of the neighborhood. Three years' experience has settled this question, and has removed all apprehension.

It is only necessary to refer to the annexed statement of the City Health Commissioner, Dr. G. E. Morgan, whose official position and professional standing, together with the full opportunity afforded by his residing near the lake, render his testimony conclusive:

Health Office,
Baltimore, January 25, 1864.

Mr. E. T. Ellicott, Water Commissioner:

Dear Sir,—In compliance with your request for my opinion as to the healthfulness of the neighborhood of Swann Lake, it affords me pleasure to say, that I believe it to be free from all malarious disease, and as healthy as any locality in the State.

My family reside within less than half a mile of the lake during all the summer and most of the fall months, that is, during all the time when disease, if any, would be contracted, they frequent the shore after sundown; this has been the case ever since the lake was made.

No one of them has ever had a symptom of disease that could be traced to the presence of the lake, nor have I ever known any one living near it contract disease that could be attributed to it as a cause.

Respectfully yours,
G. E. Morgan,
Assistant Health Commissioner.

The well known fact that lead is poisonous, naturally inspires a dread as to the influence of lead pipe used in the short connection from the iron mains on the street to the hydrants in domestic use.

The subject has been closely investigated in the northern cities, resulting in demonstrating that no danger need be apprehended. Professor Aiken, of the University of Maryland, has also investigated the subject, and favors the public with the following report, which ably discusses the question, and puts at rest all fears—a conclusion which is confirmed by other eminent chemists. *

Occasionally, and at long intervals, in the northern cities, the water has suddenly become offensive to the taste and to the smell. This alarm led to a full and elaborate investigation, conducted by the best science of the country.

As there was some slight symptoms of this nuisance at Swann Lake, it was thought advisable to select† from the several reports, that of Dr. Chitlon and of Dr. Torrey, of New York, as the most recent, and as describing and classifying the minute plant which causes the trouble.

From this very satisfactory report, confirmed by Dr. Charles T. Jackson, of Boston, it appears that no fishy or other animal matter is involved, but that the intrusion, though disagreeable, is but a vegetable formation, innoxious, and not prejudicial to health, and that there has been no recurrence of it for several years.

It is also satisfactory to know that with ample water storage, soon to be provided, this grievance may be abated and removed by the same means that are relied on to avoid the turbid waters which result from a succession of rains when they quickly follow each other.

OFFICERS OF THE WATER BOARD OF BALMIMORE, MD.
January 1, 1864.

Commissionere.

Hon. John Lee Chapman, Mayor, *President.*
John W. Randolph, *Secretary.*
Evan T. Ellicott, F. Littig Schaffer,
John B. Seidenstricker, Gerard T. Hopkins,
Francis T. King.

Engineer's Department.

James S. Suter, *Engineer.* Elisha J. Guyton, *Clerk.*

Registrar's Department.

Geo. Merryman, *Registrar.* Chas. E. Needles, *Clerk.*
Samuel J. Hindes, *Clerk.* Eli D. Howard, *Collector.*
John W. Blake, *Collector.*

* Prof. Aiken's report will be found on page 279 of this volume of the Journal.

† The report of Drs. Chilton and Torry will be found in the American Gas-Light Journal, vol. 1, pages 86, 87.

Subways.—Mr. Tite has laid before the English House of Commons a bill respecting the use of subways constructed by the Metropolitan Board of Works, of London. It is proposed to give power to the Board to require that all pipes already laid, or to be laid, under the surface, be laid in the subway; but in regard to the removal of a pipe laid under the surface before the construction of the subway, there is a power of appeal to the Board of Trade on the question whether the pipe can be removed consistently with a due regard to the purposes for which it is used. All companies and persons are to have equal right, without favor or preference, so far as space will admit, to lay gas, water, or other pipes in the subways. The board may demand rent for the use of the subways, the amount to be determined, by arbitration in case of difference.

THE AMERICAN GAS-LIGHT JOURNAL is published on the 1st and 15th of every month, and is the recognized official organ of

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Its purpose is to ascertain and make known all new discoveries in the science and economical application of LIGHT, and promote thereby the interests of companies and consumers; to encourage and aid the introduction of PURE WATER from Lakes and Rivers into Towns and Cities, and to improve the system of SEWERAGE, VENTILATION, HEATING, and DRAINAGE everywhere.

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THE

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 1ST AND 15TH OF EVERY MONTH.

C. ELTON BUCK, ... EDITOR.

MONDAY, MAY 16, 1864.

For the past few weeks there has been an absolute dearth of novelties in all matters connected with gas-lighting. Whether this dullness has arisen from sympathy with the late revulsion in Wall street, or whether it has arisen from the intense anxiety and suspense in the public mind regarding the operations of the Army of the Potomac, we cannot say. But, from whatever cause it may have come, it has left a feeling of lethargy such as we have seldom experienced.

During the past week, as a slight offset to the prevailing dullness, we have been favored by the receipt of a pamphlet on the "History and Value of Water-gas Processes," in which are some strictures by Professors TORREY and SCHULTZ upon GWYNNE's patent process, and also some remarks by Professor WURTZ, upon the zinc-water-gas process, recently patented by Dr. ELMER. Mr. GWYNNE replies to that part of the pamphlet in which his process is criticized, in a spicy circular, charging unfairness upon the report of the experiments at Elizabeth, N. J., where his process has been in operation for some months. The science of gas-making is one eminently conservative in its nature, and, considering the simplicity attending its operations, new processes are not looked upon with much favor until they have passed the ordeal of a searching and detailed examination.

The Lenoir gas-engine, which had just arrived in this country as the last number of the JOURNAL went to press, is exciting much attention in France, Germany, and England, and also in Russia. By the advertisement of Messrs. BARRETT, EXALL & ANDREWS, in another column, it will be seen that that prominent house have undertaken the management of the business in England. This is certainly a guarantee of their favorable opinion of the value of the *Moteur-Lenoir*, and it but coincides with the views of a number of other celebrated engineers in all the countries above named.

As the Lenoir engine will shortly be put into practical operation in this country, it will not be uninteresting for gas-engineers to understand something of its management. We have translated the directions for running the engine, and the management of the electrical apparatus, from the pamphlet of M. LENOIR. These directions will be found in another column. It will be seen that the engine is one which, although requiring care in keeping it in order and cleaning it, is, nevertheless, one which, by its extreme simplicity, any person of ordinary intelligence can control. When once started in the proper manner, it needs no further attention, excepting occasionally a little greasing. There is no boiler to be filled, and to be constantly tried, as in a steam-engine, nor is there danger to be apprehended from explosions. The rates of insurance are not raised by its use, for it is absolutely free from danger. Moreover, it works without making noise or dirt of any kind. These are certainly strong recommendations, and, we should think, sufficient to bring it into general use, especially for finer kinds of work. Opportunities will soon be given for witnessing the operation of this engine on a working scale, where its capacities will be fully exhibited.

ANSWERS TO CORRESPONDENTS.

J. E. T., of C. E.—*The details you furnished us, concerning the company have been mislaid, otherwise the alterations in the tables would have been made.*

A. R. F., of Pa.—*You are right.*

E. F., of N. J.—*Not that we are aware of.*

J. B. B., of Ky.—*Your informant was entirely wrong. The case as put by him is simply impossible and absurd. The simplest works on chemistry will teach you this.*

F. W. B, of Mass.—*Your gas certainly costs you too much, and if you are unable to account for it, you should secure the services of some capable engineer, and let him give the works a thorough overhauling.*

L. R. M., of N. Y.—*We will endeavor to procure a copy for you, but are not certain that we shall succeed.*

THE MAGNESIAN LIGHT.

Photographers are indebted to the perseverance of M. Sonstadt for the removal of a great obstacle. Every one knows the difficulty which has hitherto been experienced in getting a powerfully actinic artificial light. Such a light is, however, furnished by the combustion of the metal magnesium, and, thanks to M. Sonstadt, this metal is now procurable at a price which makes it available for practical purposes.

Magnesium is an easily inflammable metal. A wire of considerable thickness can be ignited in the flame of a candle, and the light evolved by the combustion is of great intensity. It has been ascertained that a wire of 0.297 millimetre diameter will give as much light as twenty-four stearine candles of five to the pound. The powerfully actinic character of the light has been recently demonstrated by Mr. Brothers, of Manchester, and Mr. Sydney Smith, both of whom have produced good pictures by its use.

The metal is neither ductile nor very malleable. It cannot be drawn, but by employing a method devised by Dr. Matthiesen it can be forced in a softened state through a small opening in an iron cylinder, and thus strands of wire of considerable length can be formed. The wire has been found to burn more steadily when three or four strands are twisted into a rope; and a simple clockwork arrangement will deliver such a rope to a spirit or oil lamp, in the flame of which it may be burned.

We look for important results from the use of this light. The opportunities for its use are numerous; and we may expect our collections to be soon enriched with pictures of objects hitherto shut out from photographers.

Some are talking wildly of "night pictures," as though they expected, by means of magnesium, to obtain a picture of the gloomy effects of midnight on a scene.

The principal use of the light will, of course, be for dark interiors; and we hope soon to see the magnificent grottoes of Adelsberg and Antiparos—which the pencil is as powerless to draw as the unaided camera to depict—revealed as brightly as the caverns in the glaciers, so well known to photographers. Another Frith may also show us the wonderful passages in the interior of the Pyramids more clearly than they have ever been seen by the traveller with the help of the two or three candles which light his way through the dark labyrinth, and enable us at our own firesides to gaze with awe on the vast range of subterranean tombs at Serapeum. All these and many more objects are now open to an enterprising man, who will no doubt soon be found to avail himself of them.—*Chemical News.*

LENOIR GAS ENGINE.

DESCRIPTION AND DIRECTIONS FOR USE.

The gas engine consists of a cylinder laid horizontally on a cast-iron frame, and a piston, which is moved in the cylinder, and which, by a connecting-rod, transmits the motion to the horizontal shaft on which the fly-wheel and motive pulley are fixed. The gas is introduced through the pipe, h, from the regulating reservoir, g, of vulcanized India rubber, which regulates the flow of gas, and prevents any sudden jerking in the gas-pipe.

A tube, K, receives the gas conveyed by the pipe, h, and conducts it to the valve, which opens and closes alternately, by means of a rod set in motion by an eccentric wheel fastened to the end of the shaft.

Two Bunsen's piles, P, sufficient to produce the electricity, are placed at a little distance from, and in communication with a Ruhmkorff apparatus, B. The electric current of this apparatus is conducted, by means of insulated wires, to the distributor, m, placed on the front part of the frame of the machine, and the course of electricity, and its arrival at the inflammator, inserted at each end of the cylinder, is directed by the movement of the piston-rod, which, by an ingenious combination, impels a small movable slide before the distributor.

The burnt gas, after having performed its functions in the machine, escapes, by means of a valve, through a pipe, S, and the water designed to cool the interior of the cylinder enters by a double passage, by means of a pipe situated near the escape-valve, and goes out by the pipe, E.

In this manner the dilated-air motor is constructed. Do you wish to give it motion? Establish the electric circuit; turn the cock of the gas-entrance; start the fly-wheel, and the motor is in operation.

Mr. Levi Foucault, in speaking of this, happily said: "That one could set it in motion or stop it, with the same ease with which he lights or extinguishes a taper."

SETTING.

Place and bolt the engine on a solid foundation, either of stone, brick, or wood. Place the meter as far as possible from the machine, taking care that the size of the meter shall be sufficient to furnish the gas necessary for the capacity of the cylinder:

One half-horse power	requires a meter of	10	burners.
One horse power	"	"	20	"
Two "	"	"	"	50	"
Three "	"	"	"	60	"
Four "	"	"	"	80	"
Five "	"	"	"	100	"

In order to feed the machine with regularity, it is necessary to place, between the meter and the engine, the gas reservoir, which is furnished with the machine by the builders. The reservoir should be so placed that it may receive the gas which has passed through the meter, and that it may again receive a supply of gas, and conduct it to the machine.

Fix the water-pipe, which is used to cool the cylinder, provided with a cock to regulate the stream; the pipe for conveying away the warm water ought to be double the diameter of that for the introduction of the cold water, on account of its dilatation. Finally, near the valve by which the burnt gas escapes, fix an iron pipe with the largest diameter which the brass outfall admits, near the escape-valve: that will facilitate the expansion in diminishing the pressure of the escape.

The diameter of the pipes ought to be proportioned to the power of the machine. A large diameter is preferable, because the escape of gas is always regulated by the cock.

DISPOSITION OF THE PILES.

The pile employed is that of Bunsen. It is composed—

1st. Of a dish of stone or earthenware.

2d. Of a zinc cylinder partitioned longitudinally.

3d. Of a porous jar of baked clay.

4th. Of a prism of charcoal.

The zinc and charcoal have on their upper parts copper conductors.

Two elements of the pile are sufficient to operate a machine of from one to four horse power.

Care must be taken that the entire surface of the electric contact of the piles should be polished, by

scouring from time to time, with emery paper; for if it is soiled it will produce insulation, interrupting the current of the fluid.

When it is necessary to unite several piles, join the copper conductor of the charcoal of the first to the copper conductor of the zinc of the second, and so forth, so to have a free zinc in the first, and a free charcoal in the last.

AMALGAMATION OF THE ZINC.

In order to obtain the most intense and regular current of electricity, amalgamate the zinc cylinder in the following manner: Pour into a wooden trough, or which is better, into a large gutta percha basin, equal parts of water and sulphuric acid of 66 degrees, commercial (oil of vitriol.)

Add to the mixture about 8.040 ounces Troy, of mercury, the residue of which may be saved after the operation.

Instead of amalgamating directly with the mercury, when the acidulated water has been prepared of the suitable strength seven or eight drops of nitrate of mercury may be poured into the earthen jar.

Afterwards rub the zinc cylinders with the compound; the mercury will adhere quickly to their sides, which will become brilliant; the operation is then complete.

When the cylinders have been used sometime, or have remained dry, it is indispensable to recommence the amalgamation.

PREPARATION OF THE PILES.

Fill the earthen jar about one-third full of water, then pour the acid, slowly, stirring with a glass rod, until the liquid indicates eight or nine degrees by the hydrometer—(or fourteen parts of water and one part of sulphuric acid, measured by quantity.)

You can use a graduated glass to obtain the measure of the mixture, without having recourse to the hydrometer.

Take special care always to pour the water before the acid, and never pour the water into pure acid, because it will have a high temperature, and the consequent boiling will project the liquid from the jar.

Place the zinc cylinder in the earthern jar. In the middle of the cylinder place the porous earthern jar containing the charcoal prism. Pour into the last jar a quantity of nitric acid of thirty-six degrees Baumé, so that the level of the liquid may correspond with that of the acidulated water in the first jar, approaching within 0.78 inch of the rims.

Fix the copper conductors to the zinc and to the charcoal.

The charcoal pole is the positive—the zinc pole is the negative.

This is the Bunsen's pile.

Put the piles in communication with the lower copper buttons of the Ruhmkorff 's apparatus

The charcoal to the left button.

The zinc to the right button.

RUHMKORFF'S APPARATUS.

This is a reservoir of electricity intended to increase the intensity of the inflammable sparks of gas in the cylinder of the engine.

Communication is established by means of four buttons fixed by copper screws at one of the ends of the cylinder: with one part, by the lower ones with the piles; with the other part, by the upper ones with the electrical distributor.

ELECTRICAL DISTRIBUTION.

The part which is bolted to the frame of the machine, is thus called, and is insulated by an indurated plate of India rubber.

By contact and friction of the copper slide, also insulated, the spark, necessary for the combustion of the gas, is alternatally evoked; first, in the front, then in the rear, in the interior of the cylinder of the engine, by means of the two insulated wires.

The distributor is composed of two parallel copper bands; the higher one is interrupted in the middle; the lower one is continued. The first part of the higher one communicates by an electric wire with the inflammator of the breach of the cylinder.

The second part of the higher one, near the cylinder, is joined to the foremost inflammator. The lower band is put in contact, by another electric wire, with the left copper button of the higher one of the Ruhmkorff's apparatus. The frame, or every other convenient part of the frame, is put in contact, by another wire, with the right button of the higher one of the Ruhmkorff coil.

MOTION OF THE ENGINE.

Place the fly-wheel at the dead point, so that the connecting rod may go beyond the vertical of the side opposite to the cylinder.

Establish the electric communication; be sure that all the pieces are sufficiently oiled; turn the cock of the meter, and also that of the water which serves to cool the covering of the cylinder.

Turn the double oil cock, placed on the cylinder, but stop it, as soon as the motor is in motion.

The straps should be loosened in order to lighten the work at the start.

In the last place, admit the gas slightly at first, by turning a little the cock under the introduction valve at the same time and in the same direction of the motor shaft; move the fly-wheel with the hand in order to help its start.

Finally, regulate the movement at the speed you require, by turning, more or less, the cock that conducts the gas into the cylinder.

GREASING.

Avoid with care, dry friction, which is generally pernicious to all machinery; but do not oil too much, for it may collect in the cylinder, and at the joints, which would render the sliding difficult.

In the opening made for the packing through which the piston rod passes, it is preferable to introduce rib grease (*Graisse de Panne*), which has not been melted.

Oil the cylinder with neatsfoot oil, which you will pour in by means of a can such as is used ordinarly in the lubrication of machinery.

GENERAL DIRECTIONS.

Preserve the machinery by cleaning it daily with woolen or cotton rags as soon as you quit working it, and while the pieces are still warm.

When you make a thorough cleaning by taking the cylinder to pieces, examine and scrape the sides of the vents by which the gas enters, and those by which the burnt gas escapes.

Avoid, as much as possible, for rubbing the polished pieces, the employment of emery paper, clay, ochre, sand, dust and all hard substances reduced to powder, for, if any grains remain between the parts rubbed, they will alter them sensibly. It is well in a manufactory to keep the machine in a glass closet. Examine [the covering and the pipes through which the water circulates, to see whether, under the influence of heat, the water has not deposited calcareous incrustations, which it will be necessary to scrape off in order to avoid obstructions.

Keep in good condition the packing through which the piston-rod passes, by changing from time to time the hemp. This care is very important to prevent losses and exhaustion. From time to time ascertain whether there is too little or too much water in the box of the meter, either of which is prejudicial to the working of the fly-wheel, and also completely interrupts the passage of the gas. If the moter should remain a long time without work, have the fly-wheel worked occasiomally by the hand to change the position and contact of the parts.

After operating a few weeks, if the valves have too much play, fasten with precaution the bolts that keep them in place; but if fastened very tight it will increase the friction. Examine frequently, at least every morning, before work is begun, the inflammators; clean the platina burners and the porcelain buttons with water made strongly alkaline with potash.

It is easy to prove exteriorly the good condition of the functions of the inflammators, by placing them in communication with any part of the frame, and by attaching the electric wire to their upper part, you will see a constant series of sparks emitted from one platina to the other.

Whether good or not, replace the piles every four days, and if you do not wish to lose electricity, remove the zinc cylinders after the work and let them dry, they will last a long time; it is equally useful to take from the acidulated bath-water the porous jars that contain the nitric acid.

The Ruhmkorff apparatus works well when it buzzes strongly; if the buzzing ceases, knock the box a little to excite it. If it persists in silence it is because electricity is wanting, and the piles ought to be charged anew.

In working the greasing cocks, if the escape in front and in rear proceeds with regularity, it proves that the motor is in good working order; if, on the contrary, you hear only one escape during the entire course of the piston, it is because one of the two inflammators needs cleaning, or because some foreign body obstructs the passage of the electric fluid, which ceases, therefore, to produce sparks.

In localities where water is scarce, it is convenient to erect two reservoirs in order to feed the stream intended to cool the cylinder, with a small feeding pump, they should be made as large as possible, in order that one may cool, while the other is employed.

As water may be condensed in the gas-pipe, place at the lowest position, a tap, to get rid of it; without this the water may form an obstruction in the interior, which may prevent the arrival of the gas at the valve. It is also necessary to permit the free escape of the vapor of the water which comes from the cylinder with the burnt gas, and if it is necessary to have the escape pipe bent in the form of an elbow, means of egress must be reserved for the condensed water.

PETROLEUM.

The following interesting *resumé* of the origin and history of petroleum is taken from the *American Exchange and Review*:

Petroleum, which exudes from the rocks in springs, and from the rock-salt formations, has been the subject of much speculation and investigation. It is a compound of carbon and hydrogen, in nearly equal proportions; a solution of paraffin, similar to the well-known asphaltum found on the shores of the Dead Sea, at the spot whence Almighty wrath swept from the face of the earth the wicked cities of Sodom and Gomorrah.

The crude petroleum is a compound of solid and liquid portions, approaching asphaltum or naptha, according to the solid or liquid state in which it is found. In chemical composition there is a close resemblance between all the bitumens—all containing the elementary gases in nearly the same proportions—the main difference being in their different degrees of solidity or fluidity.

COMPOSITION.

	Carbon.	Hydrogen.
Paraffin	24	25
Naphtha.....	14	13
Petroleum.....	2	2

Asphaltum represents the solid part of petroleum.

Oil-wells have long been known, and it is probable that they exist to a much greater extent than is generally supposed. In the Burman Empire, a group of wells yielded annually 400,000 hogsheads of petroleum. Petroleum is found in Bavaria, Italy, Persia, Palestine, and the United States; while, in the Island of Trinidad a lake of this material exists, half a mile in width, and three miles in circumference; at some seasons of the year being sufficiently hard to bear the weight of men and animals.

Mineral pitch formed a principal ingredient in the cement used in the construction of the walls of Babylon and of the temple in Jerusalem. It has also been employed successfully in the paving of streets. Petroleum exists to a great extent in Western Pennsylvania, and its preparation has become one of the most important branches of industry of the country. Thousands of barrels are now daily obtained from about 150 wells, and the oil produced by distillation, it is said, is equal to animal oils, not only for purposes of illumination, but also for lubrication. The weekly production of oils in Pennsylvania is over 300,000 barrels. There are about $10,000,000 invested in oil-wells and refineries, and the value of the distilled oil approaches in amount $4,000,000 per annum.

Liebig, in his Familiar Lectures on Chemistry, says that solidified gas is one of the great wants of the age, and seems to expect some invention by which this much desired object would be obtained. The discovery of economical processes for the distillation of petroleum, adapted to popular use, would supply this great want, as nature furnishes us the gas, or its equivalent, in bituminous substances; and inventive

talent can be directed to no field likely to produce results of more importance to mankind. The day is not far distant, however, when petroleum will either drive gas out of use, or so cheapen it as to render it more economical as an illuminator. Whoever contributes to this desirable result will deserve the thanks of the public, not only for increasing our comforts, but for assisting us to get rid of exacting institutions.

There are many opinions with regard to the origin of petroleum, the most prominent and plausible of which is that it is the product of the decomposition of vegetable matter. One writer thinks that it is distilled from strata far underlying the coal formations, in the Silurian System, some five or six miles beneath the surface of the earth; while another asserts that it is produced much nearer to hand; that, originally, coal was formed by the drifting of vegetable matter into receptacles, where it was converted into coal, and that, when the mountains were elevated, these receptacles were destroyed, and that, as coal could no longer be formed, the production of oil followed. He says:

"Now, these local deposits of oil are nothing more nor less than the unmineralized or liquid remains of the vegetation of the coal-forests. When the Alleghanies were elevated, the production of coal was immediately checked. There were no longer any basins into which the bitumen could drain. The basins that were previously filled with water were now elevated into mountains. The petroleum that had impregnated the earth, all over the western prairies, and along the slope of the Alleghanies, was drained into the bowels of the earth. There it has remained, without the loss of a drop by evaporation, and loses only a little by occasional oozings from subterraneous springs."—*Oil Circular*.

Of course we cannot subscribe to the opinions of this writer, who proves that the formation of petroleum depended upon that of coal, the favorable conditions for the formation of which was the existence of immense basins for the reception of vegetable matter, to be converted into coal, by what process he does not specify; and that, after the elevation of the mountains, the formation of coal ceased, and nature was obliged to "go into" the oil business, to avoid being "stuck" with a large amount of the raw material. Neither can we take stock in the company of the gentleman who has his distillery six miles beneath the surface of the earth, however desirable might be the freedom from competition and molestation which such an establishment would enjoy.

A merely superficial glance at the stupendous works of nature induces a belief that coal and petroleum have been stored away by the Great Designer to meet the future wants of man. Thus, we find on the tops of mountains, wrapped in impenetrable granite, the potash that is to assist in the formation of the plants which are destined for the use of future generations of mankind. Being in this state entirely insoluble, it is released by the free carbonic acid of the atmosphere, and slowly carried over the surface of the earth by the rain-water, and taken up by the plants at their convenience. Were it otherwise, the potash would be washed into the streams, and could only be supplied to plants by means of vapor, after having ascended by evaporation. So, also, we find the sulphur, of which so large a portion is contained in plants, stored away in combination with lime, as sulphate of lime, plaster of Paris, in which state it requires 500 times its bulk of water to dissolve it. Sulphur forms a large portion of the gluten of wheat, of which the muscles of man are formed, and when the enormous amount of this tissue in existence is taken into consideration, infinite wisdom and goodness seem manifest in thus storing it in abundance, and in such a state as to be readily accessible. And thus we find the carbon which is to form the wood of the present age, stored away in the earth as coal and the substance from which petroleum is obtained. During combustion, this carbon combines with the oxygen of the air, and forms carbonic acid, which is the chief portion of the food of plants, and of which its wood-fibre is formed.

And thus it is with all the arrangements of nature; nothing is left to chance, but all contingencies are provided for. It is computed that the earth contains six times as much carbon as is to be found in the atmosphere, which contains two gallons in 5,000 in the state of carbonic acid; consequently, at the period at which the formation of coal commenced, the atmosphere contained a much larger per-centage than at present, and we now warm our houses and light our streets with the carbon of an age long prior to eras of which we have any account.

The occurrence of petroleum at particular points, in situations far from the coal measures, is evidence that its existence does not depend upon the formation of coal. As in all things there is perpetual change, the solution of its occurrence in certain localities may be explained by the *rotation of trees*.

It is a matter of history that Charlemagne hunted in the forest of Gerardmer, then consisting of oak and beech, though the same forest now contains only pines of various species. On the Rhine, between Landau and Kaiserlautern, oak forests, several centuries old, are seen to be gradually giving way to the beech; while others of oak and beech are yielding to the encroachments of the pine. In the Palatinate the Scotch fir is succeeding to the oak; in the Jura and the Tyrol, the beech and the pine are seen mutually to replace each other. Many other districts of country exhibit a similar state of things. When the time for change arrives, the existing trees begin to languish one after another, their branches die, and finally their dry and naked tops are seen surrounded by the luxuriant foliage of other races. This would account for the presence of petroleum on the shores of the Dead Sea, and elsewhere, without reference to the coal formations, and, when they occur together, we must regard the coal as the result of the solidification of the former.

Change is the great law of nature; but, amid all changes, the relation between the plant and the animal is still preserved. In the decomposition of the animal, the different elements of which it consists find companions with which to associate immediately on their liberation from their former state, and those companions are the very ones best calculated to hold them in readiness for new uses. The carbon of the decomposing animal combines with oxygen, and forms carbonic acid, which is the direct food of the adjacent growing plant; the hydrogen and nitrogen combine and form ammonia, which combine with carbonic acid and form carbonate of ammonia, also a food of the plant. Thus the four elementary gases of which the animal is mainly composed, resolve themselves into compounds best calculated to minister to the wants of the plant. In the decomposition of the plant, on the other hand, its elementary constituents immediately resolve themselves, as in the case of bitumen, into those compounds best calculated to minister to the wants of man. Owing to the very large amount of vegetable matter on the earth, there is not room for it to decompose on the surface, consequently it is buried, where the process of oxidization proceeds slowly, and thus the carbon is kept in readiness for our use. Were oxidization to go on freely on the surface, and the carbon to escape into the atmosphere, there would be a superabundance of carbon for the use of plants, and wood would be formed from it without reference to animal matter. But how would we warm our houses? how light our streets? In fact, how exist at all? for the very air would destroy animal life.

It is difficult to form any conception of the enormous amount of vegetable matter—of the leaves, the branches, the trunks, the roots—that would accumulate in the locality of a beech-forest of a thousand years standing. Let us suppose this vast mass to be submerged, and to remain thus for ages, beyond the reach of atmospheric influence. In this situation, the ordinary process of decomposition could not go on, for want of free oxygen to combine with the carbon of the wood; consequently, another process takes its place. As, in obedience to the law of change, decomposition must go on, the water in contact with the vegetable matter will be decomposed, and forced to yield its oxygen to the carbon; at the same time, the hydrogen of the water combines with another portion of the carbon of the wood, and forms the substance of which we have been treating. Wood is composed of carbon and the elements of water. Then, by the oxidation of one atom of wood-fibre, there would be formed one of carbonic acid and one of water. The carbon requires two atoms of oxygen to form carbonic acid, which would set free two of hydrogen, to combine with the carbon of the wood, whose oxygen and hydrogen would form two of water; so that, while three atoms of the wood-fibre decompose two of water to procure their necessary oxygen, two other atoms of water are formed by the oxygen and hydrogen they contain; making one of carbonic acid, $CaO2$, two of hydro-carbon, and three of water, from three of wood and two of water. Although wood contains hydrogen, its carbon does not appropriate it, but derives it from the water, in accordance with the universal law of oxidation, or change, or combustion. The difference in the processes of decomposition being, that on the surface free oxygen is constantly thrown off by plants, which is assimilated by decomposing matter; while, under water, the water is decomposed to obtain it. Here we see, by a very simple change, wood-fibre become a substance which represents petroleum or asphaltum.

In the subsequent oxidation of bituminous substances, and their conversion into coal, the loss of hydrogen can be accounted for by the presence of sulphur. Plants contain a large per-centage of sulphur, as does also the earth; and as sulphur and hydrogen have a strong affinity for each other, we can readily trace the formation of sulphuretted hydrogen and liberation of carbon. The large per-centage of sulphur contained in bituminous coal is familiar to all.

The formation of coal would be the next step. The common brown coal is described as "a substance which appears to have been peat, which has long been buried in the earth, and which has undergone certain chemical changes whereby bitumen has been produced." "Bituminous coal appears to be the same substance, which has been longer buried in the earth, and has undergone still further changes."—*Hitchcock*.

And what change could take place, other than oxidation and condensation, until we come to solid anthracite, which is ninety-one of carbon to three of hydrogen?

Analysis of cannel coal (candle-coal), shows it to be composed of—

Carbon	83 75
Hydrogen	5.66
Oxygen	8.04
Ashes	2.55

Analysis of anthracite gives—

Carbon	91.98
Hydrogen	3.92
Oxygen	3.16
Ashes	0.94

If petroleum and analagous substances be a result of the alteration of coal, as has been asserted, whence comes the large amount of hydrogen contained in it? We see that in cannel coal hydrogen exists to the extent of 5½ per cent. only; while in petroleum and other hydro-carbons it exists, combined with carbon, in nearly equal proportions. How does the coal acquire this large amount of hydrogen, we again ask? We can readily understand how the carbon of the wood-fibre can undergo oxidation with loss of hydrogen, but cannot understand how a substance like coal can decompose water or anything else to secure so large a supply of hydrogen. Chemical laws are the same six miles beneath the earth's surface as they are above it, and if petroleum be distilled from shale-beds, six miles under ground, there must be, appurtenant to the distillery, a patent mode of obtaining hydrogen unknown to the denizens of these upper regions.

It has been suggested that the formation of anthracite was due to volcanic action; that, during the upheavals of the earth, the gaseous matters were *squeezed* out of the bituminous coal, and that thus its production might be traced to mechanical causes.

But if we can understand how the bitumen could be *squeezed out* of the coal-beds, we cannot understand how so large a per-centage of carbon could be *squeezed into* them. The writer in the *Coal-oil Circular*, before quoted, says:

"When the Alleghanies were elevated, the coal which they contained was subjected to more or less violence. In the anthracite basins the pressure was lateral, and came from the east as well as from below. The strata are therefore very much twisted and con-

torted. It is owing to this disturbance that the coal was converted into anthracite—not by the escape of its inflammable gases, as Professor Rogers has suggested, but by the transformation of the gases into new compounds, and into a denser body. On the Susquehanna, where the throes were less severe, the coal was less affected, and is but partially metamorphosed. Towards the Potomac, and on the Broad Top, it partakes more of the nature of bituminous coal. On the western slope of the Alleghany, where the flexures of upheaval are gentle, the coal is highly bituminous and inflammable."

But if the gaseous matters were thus squeezed into a denser body, how does this writer account for the loss of the hydrogen contained in the bitumen? By what power can he *squeeze* forty-seven per cent. of hydrogen out of a compound containing equal quantities of carbon and hydrogen?

Prof. Rogers says: "We are inclined to attribute the petroleum and its associated hydrogenous compounds to a fermentation and distillation, by subterraneous heat, of the hydro-carbon elements resident in all the carbonaceous strata underlying the rock-oil region and the coal-seams and carbonaceous coal-measures. Indeed, we are disposed to assign the oil and gas to the lower-heated Silurian and Devonian depths almost exclusively." And gives as his reasons: "Because they come forth abundantly remote from the coal formations, and where these rocks are the only ones that underlie the surface;" and because "they do not occur in the coal-fields."

Again, "We may conceive that, during the epoch, or perhaps successive epochs, of the uplifting of all these water-buried and water-side sedimentary strata, earthquake pulsations, and other undulations of the crust, formed and fixed the flexures in the strata which we have described; and that during the earthquake oscillations, and even after their cessation, a copious amount of the highly-heated subterranean steam, the constant attendant upon earthquakes, heated the strained and ruptured rocky beds, dislodged their more volatile constituents, and carried or distilled these latter, one portion into the atmosphere, and a residuary part into the interstices of the overlying cooler and less fractured strata. Upon this hypothesis, we see how, in those belts of the Alleghanies where the crust was most convulsed and the rocks were most contorted and highly-heated, the coal-beds were actually *coked* into dense anthracite, and how, further from the lines of maximum subterranean pulsation and steaming of the rocks, the volatile matters below the surface were progressively less expelled, till, entering the petroleum districts, the crust movements and warming were so moderate that they only sufficed to displace the tarry and gaseous matters from the underlying beds, to leave them, at least in part, in the cavities, and cells, and fractures of the overresting strata."

The fact that petroleum is formed in the southern part of the American continent, and runs into the streams from the forests of Brazil, shows that it may be formed 500 feet beneath the surface of the earth as well as at the distance of 7,000,500, the materials and conditions favorable to its production being present. It is not necessary to descend so far into the earth to trace the origin of petroleum, nor to suppose so great an amount of volcanic action necessary to the production of anthracite. The simple process of oxidation will account for the existence of both. All decompositions are oxidations, and the results of these oxidations vary with the substances oxidized. In the case of some kinds of wood, the product of oxidation would be bituminous substances, and the subsequent conversion of these into coal is within the range of chemical laws, and sufficiently comprehensive, though many ages might elapse before the completion of the change.

There is the same objection to the Professor's views as to those of the writer previously mentioned—the presence of hydrogen. We see, by the analysis on the preceding page, that cannel coal contains but five and a half per cent. of hydrogen, and we cannot suppose the formations mentioned, situated so far beneath the earth's surface as the Silurian system, to contain a larger amount, and yet he distils from it a substance containing more than fifty per cent. of that gas. Where does he get it?

Besides, he attributes the formation of some bituminous coal to absorption of hydrogenous compounds, distilled from strata far beneath them. Cannel coal is situated like ordinary coal formations, and why is it that it, too, was not favored with the oleaginous gift? Was there election in the case? Besides, what was there to prevent oxidation and solidification of his precious product on its long journey?

Again, he says the coal-beds were "actually *coked* into dense anthracite." Now, anthracite contains a much larger per-centage of carbon than bituminous coal, and yet we are told his anthracite acquired carbon by the very agent which disperses it—heat. Had coke been the result of the volcanic action so largely dwelt upon, the Professor's opinion would have had more weight, as the artificial preparation of coke is well understood; but the condensation of coke into anthracite is difficult to be conceived of. The *squeezing* process is altogetherin admissible.

The great size of some of the fossil plants, and the vast accumulations of carbonaceous matter, show that the vegetation of the early periods of the globe was far more abundant than at the present day. But the trees were without flowers, and unenlivened by the voices of birds; the morning song of the lark greeted not the rising sun, nor were the noontides disturbed by the humming of the bee. All nature reeked in rank and rapid growth. The landscape presented nothing but the sombre hue of solitude. The aspect, though imposing, was better fitted for a state of preparation for the higher order of animals than for their actual existence; better adapted to prepare fuel for man, than for his happy abiding-place.

POISONING OF WATER BY LEAD PIPES.

Prof. Dussance has written to the *Scientific American*, giving a detailed statement of a series of experiments on the action of several different kinds of water on lead, under various conditions. The lead was subjected to the action of the water for twenty-nine days, and the experimenter draws the following conclusions:

"I conclude from the above detailed experiments—1. That distilled water has no action whatever on lead by three days of contact; after that time the dissolving action begins. 2. That the lead is dissolved by distilled water in proportion increasing every day; the distilled water exposed to the open air dissolves more of this metal than distilled water in close vessels, or than distilled water deprived of air and gas. 3. That creek water, containing small proportions of lime, has no action on lead. 4. That distilled water, containing 1-3500th of a salt in solution, prevents the dissolving action of the water on lead. 5. That water dissolves lead till the saturating power of the acid is exhausted. 6. That, in ferruginous water, all of the iron is precipitated by lead; then lead pipe must not be used to convey mineral waters. This fact has never been noticed before. To render these facts more interesting, another series of experiments must be made to ascertain the quantities of lead dissolved daily in the water, and what compound it forms, and to see if the action will be the same in lead pipes. This will form the subject of another communication."

PATENTS.

42,126.—James Suggett, Cortland, N. Y., for a Pump for Bored Wells:

I claim the perforated pipe, a, with the pointed end, b, constructed as a drill and united with a pump, all substantially as shown and described.

42,128.—William H. Thomas, Sacramento, Cal., for a Pump.

I claim the vent or tube, b, fitted in the pipe, D, or at the bend of a siphon shaped suction pipe of a pump, in connection with a plug or stopper, c, attached to an arm, I, provided with a float, g, and fitted within a chamber, H, communicating with the pump-cylinder, A, or the cylinder pipe through which the water is discharged, all arranged to operate substantially as and for the purpose specified.

I further claim the relative arrangements of the air chamber, F, valves, C and G, and pump cylinder, A, substantially as herein shown and described.

42,163.—Pierre Brusson, New York City, for an Artificial fuel:

I claim uniting anthracite coal dust with petroleum residuum, to form blocks or lumps of artificial fuel, as specified.

42,204.—John G. Leffingwell, Newark, N. J., for a Burner for Oil-lamps:

I claim, first, Expanding the bottom end of a wick-tube, so as to make the outside shell of a burner and wick-tube of one piece of metal, as described.

Second, I claim expanding the bottom end of a wick-tube so as to enclose the ratchet-wheels of a burner, as described.

42,213.—James Molynenx, Bordentown, N. J., for an Apparatus for Forcing Oil from Wells:

I claim the combination with the pipe, D, of an artesian oil-well, of an internal pipe, C, between which and the pipe, D, intervenes a space, when the said pipe, D, is so connected with a pump or engine as that compressed air or steam may be introduced, and oil thereby expelled from the inner pipe, all substantially as shown and described.

42,242.—Wm. L. R. Valentine, Fort Edward, N. Y., for a Water-wheel:

I claim the wheel, D, constructed with two sets of buckets, F, F', one set being above the other, and the upper set, F, formed at their face-sides, with a straight triangular surface, d', and a concave surface, d, and the lower set, F', formed with concave face-sides, in combination with the conical lower plate, a, of the wheel, and the scrowl, A, all arranged as herein set forth.

42,249.—F. W. Woodward, New York City, for a Lantern:

I claim a lantern, provided with a glass flame-protector or globe, cylinder, or other form, in one piece, with a metal cap and base secured to its ends by a screw, or other equivalent fastening, which will not require the aid of plaster of Paris or cement of any kind, substantially as and for the purpose set forth.

I further claim, in combination with the mode of connecting the metal cap, base, and glass flame-protector, as described, the guards, D, attached to the cap at their upper ends, and secured at their lower ends to a band which encompasses the lower part of the flame-protector, substantially as set forth.

42,257.—J. E. Lundgrew, Stockholm, Sweden, assignor to himself and C. E. Habicht, New York City, for a Mode of Pulverizing and Preparing for Use, Coal, &c.:

I claim, First, the method herein described of pulverizing, to any given degree of fineness, vegetable, mineral or animal substances of a friable nature, or substances capable of being reduced to powder, by means of balls, or the mechanical equivalent thereof, in motion, in cylinders revolving upon their axes.

Second, The production of a substitute for lampblack, and other similar carbonaceous matter, in its various applications in the arts, by pulverizing, in the manner referred to, an impalpable powder, animal, vegetable, or mineral coal.

Third, The production of new articles of manufacture, in which coal, pulverized as referred to, is used in lieu of lampblack and other impalpable carbonaceous matter, as one of the ingredients.

42,262.—William Webb, assignor to the Scoville Manufacturing Co., Waterbury, Conn., for a Lamp:

I claim the combination of the deflector, A, perforated base, B, and imperforate shield, B', constructed and applied as herein shown and described, and for the purpose specified.

42,266.—James R. Baker, Kendallville, Ind., for a Lamp:

I claim, first, So combining a wick-tube with a lamp-burner, that it may be turned outward, by its thumb-lever, h r g, for the purpose of trimming the wick, or be removed therefrom, for the purpose of supplying a new wick, substantially as set forth.

Second, I claim so applying a wick-tube to a lamp-burner, that the flame of the lamp, when the wick-tube is turned outward for the purpose of trimming the wick, will be in a direction opposite to the oil-supply openings of the lamp, and with an interposing portion of the lamp-burner between the plane and the oil-supply openings substantially as described.

Third, I claim the foot-piece, I, in combination with the wick-tube, I, for the purpose set forth.

Fourth, I claim the detent, I', in combination with the wick-tube, I, and foot-piece, I, for the purpose set forth.

Fifth, I claim the tubular portion, m, of the sliding half-tube, N, in combination with the wick-tube, I, substantially as and for the purpose set forth.

Sixth, In combination with the collar, D, having opening, e, therein, I claim the sliding half-tube, N, with opening, e', therein, said parts being arranged and operating substantially in the manner and for the purpose set forth.

42,269.—Wm. G. A. Bonwill, Dover, Del., for a Lamp:

I claim, first, The collar, C C c', constructed as described with a series of apertures extending completely around it, variable in capacity by the action of the register, and adapted to admit a supply of cool air to the interior of the chimney immediately above the cone or deflector, from the medium outside (without first passing into the cup of burner), to prevent the chimney from being cracked or broken by sudden heat.

Second, I claim the specific combination and arrangement of the spring, F, spur-wheels, f f, shaft, F', and slotted wick-tube, E, when the said spring is firmly secured by its lower part, f', to the floor of the shell, A, is formed with a double coil, f2 f2, and rises in two standards, f3 f3, embracing the shaft F', in close proximity with the respective spur-wheels, f f, as herein described.

42,281.—Horatio Fairbanks, Boston, Mass., for a Lamp-burner:

I claim the combination of the adjustable air-supplying tube or conduit, D, with the wick-tube, A, the said conduit being movable vertically on the wick-tube, and provided with air-entrance openings, substantially as described.

I also claim the combination and arrangement of the air-supply tube, D, and its air-inlets, with the wick-tube, A, and the circumscribing chamber, a, formed by the conical tube, B, extending down from the screw-cap, C, substantially as specified.

42,286.—Joseph Grundy, Stoneham, Mass., for a Faucet:

I claim, in combination with the plate, m, and screw-rod, d, the peculiar-shaped washer, o p, and chamber, z, in the screw-rod, d, as shown and set forth.

42,289.—S. Hemenway, Fond du Lac, Wis., for a Water Elevator:

I claim the swinging windlass, by means of which the bucket is thrown forward and downward, and emptied without the backward motion of the crank and reel, substantially as specifiee.

42,328.—James Christison, New York City, assignor to Alfred W. Craven, as Trustee for the Metropolitan Fair, &c., for the U. S. Sanitary Commission, for a Cap to Contract the Flame of a Night-lamp:

I claim, as a new article of manufacture, the within-described perforated cap, B c', for the wick-tubes of lamps, the same being adapted to fit snugly around and upon the ordinary wick-tubes, and to cling thereon, substantially in the manner and for the purpose herein set forth.

42,337.—Edward John Baker, Philadelphia, Pa., for Fluid Meters:

I claim, First, the arrangement substantially as described, within a box or casing, to which the fluid to be measured is admitted, of two measuring cylinders, with their reciprocating pistons, and with any system of valves, valve-seats, and passages for admitting the fluid to, and discharging it from, the said cylinders.

Second, The arrangement, beneath the measuring cylinders, of the slide-valves, J, the valve-seats, and ports, substantially as specified.

Third, This arrangement, substantially as described, of the passages C and C', and exhaust passage, D, beneath the valve-seats.

Fourth, The slide-valves, J J, arranged in respect to each other, and operated by a crank or eccentric on the central shaft, L, substantially as specified.

Fifth, The two cylinders, with their reciprocating pistons, in combination with the shafts, Q, arms, S and S', rods, T and T', arm or crank, U, and central shaft, L, the whole being arranged for joint action, substantially as and for the purpose herein set forth.

Sixth, The piston, G, composed of cups, m and m', of leather or other like material, and perforated plates, n and n', all being constructed substantially as specified.

Seventh, The shaft, V, passing through the cover-plate, A', of the box, and having an arm or carrier, W, in combination with the central shaft, L, and its arm, U.

42,417.—James Tomlinson, Racine, Wis., for a Pump:

I claim the stationary piston, A, with globular chamber, C, and valve, D, in combination with the reciprocating cylinder, E, globular chamber, F, valve, G, ascension-pipe, H, and hand-lever, I, all constructed and operating in the manner and for the purpose herein shown and described.

42,421.—Joseph Wadsworth, Marple, England, and James Wadsworth, Salford, England, for a Gas burner:

We claim an improved gas-burner, manufactured of sheet metal, having the nipple made of one piece, and knurled, milled, or spun in, so as to form a neck, leaving the cavity of the same size above the neck as below it, substantially as and for the purpose set forth.

42,430.—James E. Boyle, Brooklyn, N. Y., assignor to himself, Dudley Kavanagh, and Geo. Stevens, New York City, for a Gas Regulator:

I claim the hollow valve-stem and valve, and two diaphragms, of unequal diameter, combined in a gas regulator, substantially as and for the purpose specified.

I also claim the opening and closing of the valve of a gas regulator by the pressure of the gas upon the surfaces of two diaphragms of unequal diameter, substantially as described.

42,439.—S. F. Jones, assignor to himself and E. L. Floyd, St. Paul, Ind. (ante-dated April 8, 1864), for a Water Elevator:

I claim a water-elevator, comprising the wheel, G, spool, H, spool, I, chain, L, weight, C, and bucket, B, all substantially as arranged and combined.

42,447.—Fr. M. Raschhanpt, assignor to A. L. Fleury and J. G. Kershaw, Philadelphia, Pa. (ante-dated April 9, 1864), for an Apparatus for Generating Carbonic Acid and other Gases:

I claim the vessel, A, with its air-pump, or other device, for imparting pressure to the interior of the vessel, the cylinder, G, and reservoir, H, or their equivalents, and the system of pipes and cocks, or their equivalents, the whole being constructed substantially as and for the purpose herein set forth.

42,455.—Joshua C. Ambrose, Jersey City, N. J., for a Coal-oil Lamp:

I claim, in combination with the burner constructed as shown, and composed of the parts, E F G H H2 L and M, the use or employment of the cone, N and N2, fount, B, and chimney, Q R, for the purpose or purposes herein fully described.

42,458.—Alfred Berney, Jersey City, N. J. (ante-dated April 19, 1864), for Destroying Forts, &c., by means of Inflammable Liquids:

I claim the above-described means of inflicting injury upon an enemy, by employing the liquid referred to, or any equivalent therefor possessing the properties above enumerated, in combination with suitable machinery for projecting the same to a distance, substantially as set forth.

I also claim using only the said crude petroleum, or said oil, or any other inflammable oil, for the purpose specified, after flame has been originated, in the manner substantially as set forth.

42,469.—Jonathan Griffin, Meriden, Conn., for an Apparatus for Vaporizing Hydro-carbon Liquids for Illuminating:

I claim the submerged perforated chamber, B, for the purpose of more equally and quickly diffusing the atmospheric air through the whole of the liquid, substantially as and for the purpose described.

I claim, also, in combination with the submerged perforated chamber, B, the submerged plate, C, to prevent bubbling or agitation of the liquid, substantially as described.

I also claim the interposition of a bright metal condensing plate, C, between the liquid in the apparatus, and the regulator or equalizer, for the purpose of collecting and returning the impurities and drip, substantially as herein described and represented.

I also claim, in combination with a vaporizing apparatus, a dome or chamber located between the liquid hydro-carbon and the lights or burners, said dome containing an elastic porous substance that will contract and expand under the varying force of the passing volume of vapor or vaporized air through it, and thus act as an equalizer of the flow of gas, substantially as described.

42,489.—John Charles Johnson, Oil City, Pa., for a Pipe-wrench:

I claim constructing gas-tongs substantially as described, by pivoting the hook or movable jaws directly to a nut, screwed into the handle, the upper part of which, above the nut, forms the other jaws of the tongs.

Also, in combination with the gas-tongs, constructed as described in the first claim, making the face of the jaw at the end of the handle inclined towards the point of the hook, so as to enable the tongs to be adapted to holding tapering surfaces.

42,492.—Martin R. Kenyon, Providence, R. I., for a Lamp:

I claim the combination of the aforesaid hinged cone and chimney holder, the thumb-piece or lifter, S, and the two-coil spring, t, when the whole are constructed, arranged, and used for the purpose and effect herein described and set forth.

IRON FOUNDRIES.

MORRIS, TASKER & CO,
PASCAL IRON WORKS,
[ESTABLISHED 1821.]
PHILADELPHIA,
Manufacture Wrought Iron Welded Tubes for Gas, Steam or Water; Lap-Welded Boiler Flues, GALVANIZED WROUGHT IRON TUBES,
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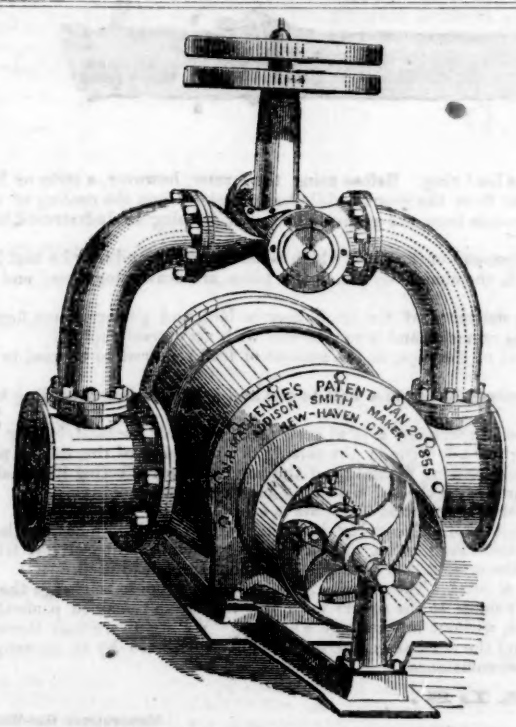

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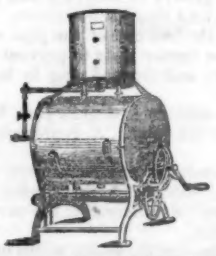

THIS MACHINE, which has been in constant use for more than two years, is now acknowledged to be the

Most Convenient, Simple, and Efficient Method

OF LIGHTING BUILDINGS OF ALL KINDS, out of the reach of regular gas-works, ever brought to public notice.

The SIMPLICITY OF THE APPARATUS, its ENTIRE FREEDOM FROM DANGER, the LITTLE ATTENTION REQUIRED, the EASE WITH WHICH IT IS MANAGED, and THE CHEAPNESS and SUPERIORITY OF THE LIGHT, has gained for it the favorable opinion of those acquainted with its merits.

The Machine takes up but little room; no disagreeable odor is experienced in its use; no fire is applied to the apparatus at all; it can be attached to ordinary gas-pipes used for coal-gas, and is burned through the same kind of fixtures.

These Machines are manufactured in Boston, by the AUTOMATIC GAS-MACHINE CO., and are for sale at their Store, 78 Washington street, Boston, and also at the Agency, MITCHELL, VANCE & CO.'s, No. 620 Broadway, New York.

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AN INDESTRUCTIBLE COATING FOR

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It consists of seventy-two parts Oxide of Iron, and twenty-eight parts Cement Lime Stone in the one hundred pounds.

It has much more body than red or white lead. It is warranted perfectly water and fire-proof and to withstand a greater heat on metals, without scaling, than any other paint in use.

It is a perfect cover for all kinds of iron, tin, or wood-work, out-houses, and canvas coverings. It prevents and arrests the corrosion of metals, and is not affected by the action of salt, gases, acids or ammonia.

It hardens under water, as has been fully demonstrated by its application to gas-holders, by many of the largest gas companies in the United States; which companies having thoroughly tested its properties as herein claimed, pronounce in its favor over any other paints in the market, even though sold at double its price.

As a coating for patterns of iron or wood, when mixed with shellac, it is much superior to beeswax, oil, or shellac alone, as has been proven at the large founderies in the country.

For patching boilers and making joints, it is considered superior to red lead, or any other preparation.

For cleaning metals it takes the place of crocus, rouge, and emery, being better and cheaper.

This Paint requires no more oil than dry lead or zinc, and much less than the ordinary mineral paints. It is free from any waste, and possesses a spreading and covering power unequaled.

Terms, by the Barrel or Half Barrel, Four Cents per Pound.

A liberal discount made to parties purchasing by the ton.

A Barrel or Ton will be forwarded to any gas companies desirous of testing its qualities, for which there will be no charge if it does not give entire satisfaction as being the cheapest and most durable of all other Paints in the market.

Also, Prince's Imperial Black Paint, and Prince's Protoxide of Iron.

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THE PROPRIETORS of this unrivalled joint are now prepared to introduce it to general use, and to guarantee that, in all respects, it will fulfil perfectly all the requirements of either water, gas, or steam. It is a joint which remains in all situations absolutely tight.

The following illustrations, with the appended explanations, will give a good idea of the improvement:

Fig. 1.

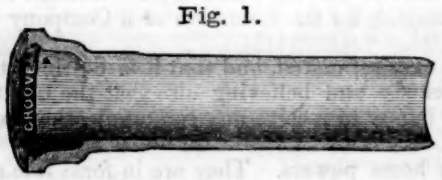

Fig. 3.

Fig. 2.

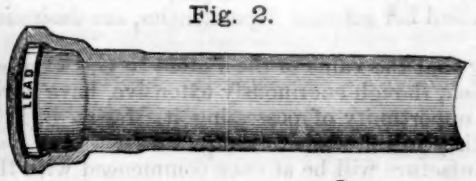

Fig. 4.

FIG. 1. Is a sectional view of a pipe showing a groove to receive a lead ring.

FIG. 2. Is a sectional view of a pipe showing a lead ring in the groove.

FIG. 3. Represents a former, which is used in the bell end of the pipe while casting the lead ring. Before using the former, however, a strip or belt of India rubber is first inserted in the socket, against which the former rests to prevent the lead escaping from the groove while being cast. Upon the cooling of the lead, the former and rubber ring are withdrawn from the socket, and the lead ring is left projecting inwards from the groove all around, forming an indestructible packing to receive the spigot-end of the pipe.

FIG. 4. Shows two pieces of pipe in connection with an hydraulic jack, by which the spigot-end of the pipe (which is cast tapering and may be cast in a chill), is forced into the lead ring in the groove which perfects the joint. A, represents the jack; B, B, the chains by which the pipes are drawn together; and C, C, pieces of pipe.

This ring joint packing may be cast at the foundry or any convenient place, and when delivered at the ditch, may be laid, and perfect joints formed, by any laborer, above or below the surface, or in ditches filled with water, there being *no joint ditching required*, and it can be laid with very great rapidity.

Among the economies realized by this joint may be enumerated, the saving in the weight of the pipe, in the amount of lead required to be used in forming the packing, in the labor of ditching, and in laying the pipe.

The bell or socket may be cast one-half the usual length, as the width of the groove requires, but from a half to one and a half inches, according to the size of the pipe, thus saving in the total weight about two hundred pounds per ton.

The weight of lead required to form this joint, as compared with the amount of lead used in forming a joint according to the old method, is fully seventy-five per cent. less, only so much being required as to maintain the compensating principle, or enough to allow (upon the raising or depressing of the line of pipe out of a direct line) what is lost upon one side of the ring packing, to take its place upon the other; thus securing flexibility of the joint without affecting its reliability. The use of yarn or hemp packing is dispensed with, the cost of which is an entire saving as compared with the old method of making joints.

The saving of labor in ditching is the total amount usually expended in digging joint-holes, there being *no joints to be caulked.*

The saving in labor in laying pipe furnished with this joint is a sum equal to the whole cost of carrying lead, fuel, ladles to the ditches, casting the lead, bailing out water, and the entire labor of caulking, less only the sum charged for casting the lead ring packing at the foundry, which is comparatively trifling. This last-mentioned economy has been estimated by the best engineers at seventy-five per cent., or the same as the saving in the quantity of lead used.

The cost of pipe cast from our patterns is the same per ton as pipe cast for the old form of joint. The principal iron-founders propose to charge the same price.

We have submitted these joints in water-pipes to a pressure of two hundred and fifty pounds to the square inch, and they have remained perfectly tight. It has also been submitted for months in gas-pipes to the ordinary pressure of our city gas-mains, without any leakage whatever. We are aware that these statements may be deemed by many extravagant, but the merits of the improvement warrant them all, and the most skeptical may be fully convinced by an investigation of its value, and by witnessing the tests to which we submit it, or by its use under any conceivable circumstances.

TESTIMONIALS.

OFFICE OF THE WATER COMMISSIONERS,
CITY HALL, JERSEY CITY, October 14th, 1863.

Dear Sir,—On the 26th of May last, about two hundred and sixty feet of cast-iron water-pipes, six inches in diameter, with joints constructed according to your invention, were laid for the Jersey City Water-Works, in Prospect street.

The operation of uniting the joints of the pipes, was performed with remarkable facility, and with an important saving in time, materials, and labor. The joints proved perfectly water-tight, after turning the full head of water on the pipes.

In my opinion, your invention has proved entirely successful, and will be found highly beneficial to water companies.

Yours, respectfully,
ROBT. C. BACOT,
Superintendent and Engineer, Jersey City Water-Works.

MR. R. C. ROBBINS.

ENGINEER'S OFFICE, CROTON AQUEDUCT DEPARTMENT.

Dear Sir,—I have examined your plan for making joints in cast-iron water pipes, and have a report from one of my assistants, of certain experiments made by you, to prove the certainty and economy with which the joints can be made, and their stability when finished.

I think the experiments showed that the joints could be made quite as rapidly, if not more rapidly, than those made in the ordinary method now in use; the quantity of lead used was less than that required in the common joint, and no yarn packing was required. In these respects, your joint seems superior.

After the joints were made, a pressure of three hundred pounds to the square inch, was put upon the pipe in such a manner as to test the efficiency of the joint to prevent both leakage of water, and separation of the pipes from each other longitudinally. This pressure failed to produce either leakage at the joint, or separation, so long as the pipes lay in a direct line; but on deflecting them six and a half inches, in a length of twelve feet, the joint commenced leaking. It is fair to add, that this is a greater deflection than would often be found necessary in laying pipe.

I think the efficiency of the joint in both the points tested in this last experiment, might be increased by increasing the quantity of lead, both in thickness and width.

Altogether, the result of the experiments was such that I have determined to make a more thorough est of your invention by putting down about one thousand feet of pipe, when we commence our operations for the coming season.

The diameter of the pipe subjected to experiment, was six inches, and is the same size that I propose to put down next year.

I am, very respectfully, your obedient servant,
A. W. CRAVEN, Chief Engineer, &c.

To R. C. ROBBINS, Esq., Jersey City.

METROPOLITAN GAS-WORKS,
ENGINEER'S OFFICE, NEW YORK, October 9th, 1863.

Dear Sir,—The undersigned had the pleasure of being present at an experimental test of your patent joint for gas and water pipe, made at the yard of the Croton Aqueduct Department, and cheerfully testify to the results obtained, namely:

First experiment was made with two lengths of eight-inch pipe, jointed together, when a pressure of three hundred pounds to the square inch was applied. This pressure did not force the pipe apart, nor start the joints, but they remained, during this experiment, perfectly tight.

Second experiment was made by deflecting the pipe five inches, which is about equal to eighteen inches in one hundred feet, and the same pressure applied, which caused a small leak at the joints.

Third experiment was made by taking the pipes apart and rejointing them, when the same pressure was applied when lying straight and when deflected; at this experiment there was no leakage.

From these severe tests it is my impression that the superiority of your patent joint has been made manifest, and that it must eventually supersede the old way of jointing pipes together, saving both time and material.

Wishing you success in your enterprise,

I am, very respectfully, yours, &c.,
AMBROSE J. WHITE, Engineer.

To R. C. ROBBINS, Esq.

OFFICE OF THE METROPOLITAN GAS-LIGHT COMPANY,
NEW YORK, October 9th, 1863.

Dear Sir,—Having been present at the testing of your patent joint for gas and water pipe, at the yard of the Croton Aqueduct Department, I can testify to the results as stated by Col. A. J. White and fully concur with him in the opinion expressed in his letter to you of this date.

Very respectfully, yours,
W. TITUS, Secretary.

R. C. ROBBINS, Esq.

NEW YORK, October 23d, 1863.

Gentlemen,—I am pleased to be able to inform you, that we are fully satisfied that we have done well in adopting your "Improved Joint," in the construction of an aqueduct which we are now building on Oil Creek, Northwestern Pennsylvania.

We have ten miles of three and four inch pipe to lay this season, and, in our estimation, the perfection of the joint, economy in lead, and rapidity with which the pipe can be laid, render it entirely preferable to any other method of laying pipe.

Our Mr. Hutchings advises us that he is putting down the three and four inch pipe at the rate of twenty-five to thirty lengths per hour, with two men in the trench. We are much pleased with this result.

Respectfully yours,
HUTCHINGS & FOSTER.

Messrs. R. C. ROBBINS & Co.

For further information, or for prices and terms, which will be very reasonable, apply to

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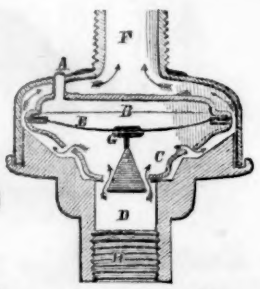
No. 218 FULTON STREET, NEW YORK.

THOMPSON'S

PATENT

AUTOMATIC GAS CONTROLLER.



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WE RESPECTFULLY INVITE YOUR ATTENTION TO THE FOLLOWING TRUTHFUL DESCRIPTION OF THE construction and operation of this recent and most important invention; its application to every street lamp, and on the fixtures within the works of the Gas Companies, as well as for the use of the general consumer, will be found to effect perfectly and reliably, the object so long sought for, viz.: **a perfect control of the Gas under varying pressures, emitting the Gas at the burner without force, and without increase or diminution of quantity, and hence promoting the highest possible illuminating power of the Gas.**

THE AUTOMATIC GAS CONTROLLER

Is designed to occupy the place of the gas-burner. Within the circumference of a small cylinder, below the burner, is placed a conical valve, attached to a movable diaphragm, the valve and valve seat is proportioned, so that under a supply of Gas, varying in pressure from four-tenths to five inches, the burner will continue to produce the same consumption and development. The unerring accuracy of movement of the Diaphragm at every change of pressure, whether gradual or sudden, and its positive control of the valve which admits, by its proportionate increased or diminished aperture, the same unvarying amount of Gas, has elicited the unqualified approbation of engineers and other experts in the profession.

The simplicity of its construction, and materials used, are a sure guarantee of its durability and continued successful operation. They afford to the consumer of Gas the advantage of a **superior light, with the greatest possible economy**; and for the Gas Company, they control the Street Lamps, affording a more satisfactory light for the public, without waste.

The public are invited to witness its operation, at the Office of the Company; and samples will be sent to Gas Companies for experiment, on application by letter or otherwise.

G. W. THOMPSON & CO.,

Office, 52 GREENE ST., (up stairs.)

A. L. BOGART, AGENT, 592 BROADWAY, **New York.**

We are permitted to refer to the following Gentlemen, who have thoroughly examined our Gas Controller:

GEO. H. KITCHEN, Inspector of Gas Meters, 561 Broadway.
CHAS. ROOME, President Manhattan Gas Company.
J. H. ADAM, President New York Gas Company.
PETER COOPER, Cooper Institute.
JOHN A. DUFF, Olympic Theatre.

THE AMERICAN METER CO.,

Organized under the General Manufacturing Laws of the State of New York.

SAMUEL DOWN, PRESIDENT. HENRY CARTWRIGHT, VICE PRESIDENT. RICHARD MERRIFIELD, SECRETARY AND TREASURER.

TRUSTEES.

SAMUEL DOWN, WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, *Superintendent at Philadelphia.*

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS and REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy, and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

340 WEST TWENTY-SECOND STREET, NEW YORK,
ARCH AND TWENTY-SECOND STREETS, PHILADELPHIA,
1 BARRETT STREET, BOSTON, will meet with prompt attention.

STEAM-PUMPS.

WORTHINGTON'S STEAM PUMPS, extensively used by Gas-Light Companies. For Sale at greatly Reduced Prices. Also, a new and highly successful Pump, driven by water pressure, requiring no attention or repairs, and the most economical water motor yet constructed.

Patent GATES, for Water and Steam-stops.
HENRY R. WORTHINGTON,
61 Beekman street, N. Y.

WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.
J. D. WEST & CO.,
179 BROADWAY, N. Y.

PETROLEUM GAS.

THE AUBIN GAS-WORKS COMPANY, OF ALBANY, N. Y., have adapted their Works to petroleum and the heavy oil obtained from its distillation. Parties desiring information will be referred to Village Gas-Works thus adapted, where the ordinary yield of gas is from 150 to 200 cubic feet per gallon of oil. This yield, and the great improvements which experience has added to the Aubin Works, enable them to make a rich gas at a low cost—the only way to compete with kerosene.

TO GAS COMPANIES.

THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

CHAS. M. CRESSON,
Late Asst. Engineer of the Philadelphia Gas-works,
417 Walnut st., Philadelphia.

ANALYTICAL CHEMIST

C. ELTON BUCK,

Analytical and Consulting CHEMIST,

39 NASSAU STREET, NEW YORK,

Analyses of Ores, Minerals, Soils, Guanos, Coals, &c., and Tests of Commercial Articles, carefully and promptly made. Consultations may be had, and opinions given on Chemical questions. Samples for analysis from a distance, may be sent by mail or express, directed to the **Laboratory as above.**

GLYCERIN

FOR

Filling Wet Gas-Meters,

Cheaper than Whisky or any other substance.

We have furnished the Cincinnati Gas and oke Company 300 barrels Glycerin, for filling their wet meters, and are now ready to supply other Gas Companies at the lowest cash prices.

We warrant our Glycerin not to corrode the meter metal, nor to freeze at the lowest ordinary temperature, nor to evaporate.

HARTMAN & LAIST,
Manufacturing Chemists,
Cincinnati, O.

Office 64 Sycamore.

NEW YORK FIRE-BRICK and Clay Retort Works. (Branch Works at Kreischerville, Staten Island.)

B. KREISCHER, office 56 Goerck street, corner Delancy street, New York.

GAS RETORTS, TILES and FIRE-BRICK of all shapes and sizes. FIRE MORTAR, CLAY, and SAND. Articles of every description made to order at the shortest notice. B. KREISCHER.

WOODEN PURIFYING TRAYS.

PATENT

Conically Slotted Solid Wood Sieves

FOR GAS PURIFIERS.

CAUTION

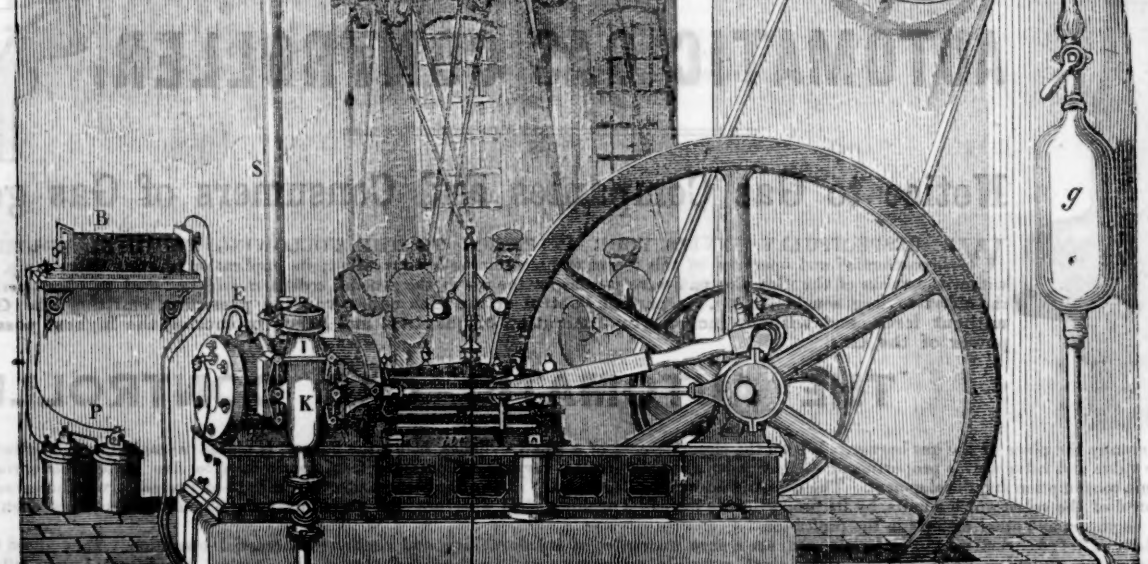
TO

GAS MANUFACTURERS.

The Conically Slotted Solid Wood Tray was patented 21st October, 1862, by N. O. Hawxhurst, assignee of Wm. Combe, and all persons are cautioned against purchasing such trays of R. G. Hunt, or any other person except the subscriber, as it is a direct infringment of said patent. The following companies are now using these trays.

Manhattan, New York,
Williamsburgh,
Brooklyn,
Albany,
Baltimore,
Philadelphia,
Chicago.
Louisville,
And numerous others.

Orders received by mail or otherwise.
JOHN L. CHEESMAN,
147 Ave. C, New York City.



MOTEUR—LENOIR.

LENOIR GAS ENGINE.

This is a horizontal engine, in which a piston, by a connecting rod drives a horizontal shaft.

The gas enters by the pipe "h" from the regulating reservoir "g," (made of vulcanized india-rubber,) which regulates the feeding and the branches connected with the gas-pipe.

A tube, K, receives the gas conveyed by the pipe "h," and conducts it to the valve, which opens and closes alternately, by means of a rod moved by an eccentric wheel fastened to the end of the shaft.

Two of Bunsen's piles, P, sufficient to produce the electricity are placed at a little distance from, and in communication with a Ruhmkorff electric apparatus, B. The electric current of this apparatus is conducted by means of insulated wires to the electricity distributor "m," placed on the front of the frame, while the current of electricity and its arrival at the inflammator, inserted at each end of the cylinder, is directed by the movement of the piston-rod, which, by an ingenious combination, impels a small movable slide before the distributor.

The burnt gas, after having performed its functions in the machine, escapes, by means of a valve, through a pipe, S, and the water designed to cool the interior of the cylinder enters by a double passage, by means of a pipe situated near the escape-valve, and goes out by the pipe, E.

A two and a half horse Engine has arrived from Paris and is now being erected and put in practical operation, when due notice will be given to the public. The lateness of its arrival precludes further notice of it in this advertisement than to say to those who are unacquainted with the principle, that the

LENOIR GAS ENGINE

Requires no Fire and makes no Smoke,

No Noise, no Dirt, and cannot Explode.

See full description in this number on page 344.

It is propelled by the expansion of Air, dilated by the explosion of Gas, which is ignited by the

ELECTRIC SPARK.

In the meantime, enquiries may be addressed to the

Editor of the American Gas-Light Journal,

NEW YORK.